

Bottineau County, North Dakota

including the Cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City

Multi-Hazard Mitigation Plan

(2015 Revision)



Revised in 2015 with assistance from:



(701) 751-3370 www.wenck.com

EXECUTIVE SUMMARY

On October 30, 2000, the President signed into law the Disaster Mitigation Act of 2000. Among its other features; the Disaster Mitigation Act of 2000 established a requirement that in order to remain eligible for Federal Disaster Mitigation grant funds, local and state governments must develop and adopt Multi-Hazard Mitigation Plans. On February 26, 2002, the Federal Emergency Management Agency published an Interim Final Rule that set forth the guidance and regulations under which such plans are to be developed. The Interim Final Rule provides detailed descriptions of both the planning process for states and local governments and the plan contents that emerge from the planning process. The original version of the Bottineau County Multi-Hazard Mitigation Plan was approved by the state and FEMA in 2003 and adopted shortly thereafter by Bottineau County and its 12 cities. The Interim Final Rule specifies that jurisdictions must update their Multi-Hazard Mitigation Plans every five years.

Hazard mitigation is defined by FEMA as “any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.” Mitigation creates safer communities by reducing loss of life and property damage. Hazard mitigation planning is the process through which hazards that threaten communities are identified and profiled, likely impacts of those hazards are assessed, and mitigation strategies to lessen those impacts are identified, prioritized, and implemented. The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of \$4 in avoided future losses in addition to saving lives and preventing injuries (National Institute of Building Science Multi-Hazard Mitigation Council 2005). This plan demonstrates Bottineau County’s, and the Cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City commitment to reducing risks from hazards and serves as a tool to help decision makers direct and coordinate mitigation activities and resources, including local land use policies. This plan update entailed a comprehensive re-evaluation of all parts of the plan, including hazard profiles, risk assessment, mitigation goals, strategies, and mitigation priorities.

The major hazards – communicable disease; drought; flood; hazardous material release; homeland security incident; shortage or outage of critical materials or infrastructure; summer storm; transportation accident; urban fire or structure collapse; wildland/rural fire; winter weather; geologic hazards; and windstorm – are each profiled in terms of their hazard description, history, probability, magnitude, geographic location, vulnerabilities, loss estimates, and data limitations and other factors. The vulnerabilities to critical facilities, critical infrastructure, structures, the population, economic, ecologic, historic, and social values, and future development are evaluated for each hazard.

Based on the probability and extent of potential impacts identified in the risk assessment, the prioritizations of hazards within Bottineau County are as follows: (Note that individual jurisdictions have their own prioritizations based on the hazards and vulnerabilities specific to their locations. Their priorities can be found in Section 4.15)

Bottineau County Hazard Prioritizations *(Based on Planning Committee Selection and THIRA Guidelines)*

Level/Class	Hazard
Very Likely	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Likely	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wild-land Fire
Possible	Drought Homeland Security Incidents Transportation Accident
Unlikely	Urban Fire or Structure Collapse Dam Failure Geologic Hazards
Improbable	None

Bottineau County completed Step 1 of the Threat Hazard Identification Risk Assessment (THIRA) in 2013. The Multi-Hazard Mitigation Planning Committee reviewed the 2013 THIRA results and made some minor changes in hazard prioritization. The THIRA used different terminology than the Hazard Mitigation Planning Committee, but there are similarities to the terminology; such as ‘Homeland Security Incidents’ which would include Cyber Attacks, and other various forms of terrorist incidents.

THIRA Identification for Bottineau County as of 2013

() Denotes Different than Planning Commission’s Assessment*

	Score	Very Likely 5	Likely 4	Possible 3	Unlikely 2	Improbable 1
Catastrophic	5			CBRN Terrorism		
Significant	4					
Moderate	3		Human Pandemic Outbreak		Explosives Terrorism Attack	
Minor	2	Winter Storm Hazmat Spill		Armed Assault Biological Food Contamination	Animal Disease Outbreak	
Negligible	1	Summer Storm Wildfire	*Flood	Cyber Attack Dam Failure	Radiological Substance Release	

The following goals are outlined in the plan's mitigation strategy, based on the results of the risk assessment:

Goal 1: Save lives and reduce injuries.

Goal 2: Protect private and public property and the environment.

Goal 3: Promote the use of mitigation measures that reduce the impacts of all hazards.

Goal 4: Protect the citizens of Bottineau County from natural and man-made hazards.

Goal 5: Increase public awareness of hazards through emergency services awareness and educational campaigns.

Associated with each of the goals are objectives and mitigation actions ranging from adopting building codes to burying electric infrastructure to community education. The mitigation projects are prioritized based on STAPLEE criteria to determine if a project is socially acceptable, technically feasible, administrative possible, politically acceptable, legal, economical (cost/benefit), and environmentally sound. An implementation plan outlines the suggested course of action, given the limited resources available to Bottineau County and the jurisdictions. The Bottineau County Office of Emergency Management is responsible for the implementation and maintenance of the plan. Other recommended activities, such as integrating this plan into a variety of county, city, and township plans, regulations, and documents, will further the goals of hazard mitigation in Bottineau County.

The Bottineau County Multi-Hazard Mitigation Plan exceeds the requirements of a local hazard mitigation plan as outlined in the Interim Final Rule published in the Federal Register on February 26, 2002 at Title 44 of the Code of Federal Regulations, Part 201 as part of the Disaster Mitigation Act of 2000. This plan has been approved by the Federal Emergency Management Agency as a Hazard Mitigation Plan, and therefore, the county and cities may be eligible for federal mitigation funds. This plan serves as a guide for understanding the major hazards facing Bottineau County and the jurisdictions and provides a strategy for preventing or reducing some of the impacts.

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1. INTRODUCTION

Bottineau County is confronted daily with the possibility of a serious incident of emergency proportions. Natural and man-made hazards pose a constant threat to the health, welfare, and security of people and property. The cost of response to and recovery from disasters is so high and life is so precious that attention must turn to mitigating disaster effects and impacts before they occur or re-occur.

Historically, mitigation activities have been the most neglected programs within emergency management. Since the priority to implement mitigation activities is generally low in comparison to the perceived impact from hazards, some important mitigation measures take time to implement. Mitigation success can be achieved, however, if accurate information is portrayed through complete hazard identification and impact studies, followed by effective mitigation salesmanship and strong government leadership. It is possible to break the cycle of recurring damage and loss.

The Bottineau County Multi-Hazard Mitigation Plan represents a coordinated effort and ongoing commitment to mitigate potential losses and damages caused by the hazards. This plan establishes the county mitigation planning system, which is related to the county disaster, emergency preparedness, and operational planning mission. The plan identifies opportunities and suggestive actions that could reduce the impact of future disasters or emergencies.

1.1 Purpose

Bottineau County and the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City, the townships, and the unincorporated communities recognize that hazards, both natural and man-made, threaten their communities. Rather than wait until a disaster strikes, the jurisdictions can take proactive measures to prevent losses and lessen the impact from these hazards. Actions taken to reduce or eliminate the long-term risk from hazards are defined as mitigation. Disaster mitigation is an investment that can save lives and money.

The purpose of this Multi-Hazard Mitigation Plan is to:

- Promote pre and post disaster mitigation measures, including long range strategies that minimize suffering, loss of life, and damage to property resulting from hazardous or potentially hazardous conditions to which citizens and institutions within the county are exposed.
- Eliminate or minimize conditions that would have an undesirable impact on the citizens, economy, environment, and well being of the county.
- Serve as a consolidated, comprehensive source of hazard information.
- Educate the communities, including government leaders and the public, on their vulnerabilities.
- Prioritize and promote cost-effective mitigation solutions.
- Provide guidance to organizations and agencies countywide regarding hazard mitigation.
- Make Bottineau County, its cities, and townships eligible for Hazard Mitigation Grants.
- Encourage long-term community sustainability.
- Fulfill federal, state, and local hazard mitigation planning responsibilities and to be in compliance with State and Federal Laws.

Effective mitigation planning promotes a broader understanding of the hazards threatening the communities and provides a clearer vision and competitive edge for future mitigation grant funding. By integrating mitigation concepts into local thinking, the communities will find many more opportunities for disaster resistance beyond grant funding. For example, the consideration of disaster mitigation when designing new facilities or subdivisions will result in cost-effective solutions and greater disaster resistance, thus saving the communities money in the long-term and contributing to the communities' sustainability.

1.2 Scope and Organization

1.2.1 Scope

The scope of the Bottineau County Multi-Hazard Mitigation Plan is countywide. In this document when Bottineau County is stated, it is inclusive of the incorporated cities, unincorporated communities and the townships that rely on county zoning practices. The plan is not necessarily limited to federal, state, or locally declared disasters or emergencies or grants. Anytime local situations and incidents produce a requirement for mitigation actions, activities, and strategies, they will be developed and incorporated into the plan.

The Bottineau County Multi-Hazard Mitigation Plan is organized into sections that describe the planning process (Section 2), assets and community inventory (Section 3), risk assessment/hazard profiles (Section 4), mitigation strategies, actions and implementation (Section 5), and plan maintenance (Section 6). Appendices containing supporting information are included at the end of the plan.

This plan, particularly the risk assessment section, outlines each hazard in detail and how it may affect Bottineau County and the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City, the townships, and the unincorporated communities. The mitigation strategy outlines long-term solutions to possibly prevent or reduce future damages. Additional hazards may exist that were not apparent to local governments or participants through the development of this plan, and certainly, disasters can occur in unexpected ways. Although any and all hazards cannot be fully mitigated, hopefully, this plan will help the communities understand the hazards better and become more disaster resistant.

The funding of the hazard mitigation strategies and actions may be local funding or may include grant funding. Grant funding comes from a variety of sources but usually funding is from the state. They include:

Disaster Funded Mitigation Assistance

Hazard Mitigation Grant Program (HMGP): Provides grants to States, Tribes, and local entities to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to

purchasing supplies to fight the flood. In addition, a project’s potential savings must be more than the cost of implementing the project. Funds may be used to protect property or to purchase property that has been subjected to, or is in danger of, repetitive damage. The amount of funding available for the HMGP under a disaster declaration is limited. When a Presidential Disaster Declaration is granted, the federal government will assist the state, tribal, and local governments pay 75% of the disaster recovery costs. The HMGP may provide a state or tribe with up to 20 percent of the total disaster grants awarded by FEMA. The cost-share eligibility requirement for this grant is 75 percent federal/25 percent non-federal.

Hazard Mitigation Assistance Programs

Program Overview

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Eligible Applicants and/or Sub Applicants include:

- State
- Local governments
- Indian tribes or other tribal organizations
- Certain private non-profit organizations

PRE-DISASTER MITIGATION GRANT PROGRAM

The Pre-Disaster Mitigation (PDM) program provides funds for hazard mitigation planning and projects on an annual basis. The PDM program was set in place to reduce overall risk to people and structures, while at the same time, also reducing reliance on federal funding if an actual disaster were to occur.

Eligible Applicants and/or Sub Applicants include:

- States
- Territories
- Commonwealths
- Indian Tribal Government

Eligible Sub Applicants include:

- State Agencies

- Indian Tribal Governments
- Local Governments/Communities

FLOOD MITIGATION ASSISTANCE PROGRAM

The Flood Mitigation Assistance (FMA) program provides funds for projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis.

There are three types of FMA grants available to Applicants:

- Planning Grants - to prepare flood mitigation plans
- Project Grants - to implement measures to reduce flood losses, such as elevation, acquisition or relocation of NFIP-insured structures
- Management Cost Grants - for the grantee to help administer the FMA program and activities

Eligible Applicants

- States
- Territories
- Commonwealths
- Indian Tribal Government

Eligible Sub Applicants

- State Agencies
- Indian Tribal Governments
- Local Governments/Communities

1.2.2 Organization

This plan is organized around FEMA's mitigation planning process and is divided into six chapters:

Chapter 1 Introduction explains the purpose, organization, scope, authority of the plan, and provides a general overview and history of Bottineau County.

Chapter 2 Planning Process explains the planning process, including how the plan was prepared, who was involved, and how it was integrated with other related planning efforts.

Chapter 3 Assets at Risk/Future Development includes critical facilities and infrastructure; population; buildings; economic ecologic, historic, and social values; land use; new development; and future development.

Chapter 4 Risk Assessment features the risk assessment, which identifies the type and location of hazards that can affect Bottineau County, analyzes vulnerability to the hazards identified at the county level, and serves as the factual basis for the mitigation strategy.

Chapter 5 Mitigation Strategy provides the County's mitigation blueprint. Specifically, it includes goals and objectives and local mitigation actions. It also presents the mitigation funding sources, project prioritization, and project implementation.

Chapter 6 Plan Monitoring and Maintenance includes the County's approach to plan monitoring, plan evaluation, plan updates, plan update process, implementation through existing programs, and public involvement.

Appendices include information and documentation on participation, meeting summaries and agendas, glossary and acronyms, FEMA Crosswalk reference document, FEMA and NDDDES Approval letters and jurisdictional adoption documentation.

1.3 Authorities

The Bottineau County Multi-Hazard Mitigation Plan has been prepared by Bottineau County pursuant to the Disaster Mitigation Act (DMA) of 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section, Section 322 – Mitigation Planning. The requirements of such are outlined in the Interim Final Rule published in the Federal Register on February 26, 2002 at 44 CFR Part 201, with some additional amendments. This legislation requires all local governments to have an approved Hazard Mitigation Plan in place by November 1, 2004 to be eligible to receive Hazard Mitigation Grant Program (HMGP) and other types of disaster and mitigation funding.

The North Dakota Century Code, Chapter 37-17.1, as amended, requires the North Dakota Department of Emergency Services (DES) to support and plan for mitigation activities. The North Dakota State Water Commission is responsible for promoting flood insurance and flood mitigation activities. The State of North Dakota has its own Multi-Hazard Mitigation Plan that is linked to this countywide plan.

The Bottineau County Multi-Hazard Mitigation Plan has been reviewed and approved by the North Dakota Department of Emergency Services and FEMA Region VIII Mitigation Planning staff. Bottineau County and the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City have adopted this Multi-Hazard Mitigation Plan by resolution (see Appendix F for copies of the resolutions). These governing bodies have the authority to promote mitigation activities in their jurisdictions.

The execution of this mitigation plan is the responsibility of the various local government leaders and other elected and appointed officials that are in the position to make decisions capable of reducing or eliminating the threat or potential impact on life, property, and the environment. State and local emergency management officials are available to assist chief executives in initiating and carrying out plan initiatives. This plan does not replace existing preparedness and operational plans currently in use by state or local governments. Instead, this Multi-Hazard Mitigation Plan provides valuable mitigation strategies, which can serve to strengthen or improve the effectiveness of state and local emergency operational plans.

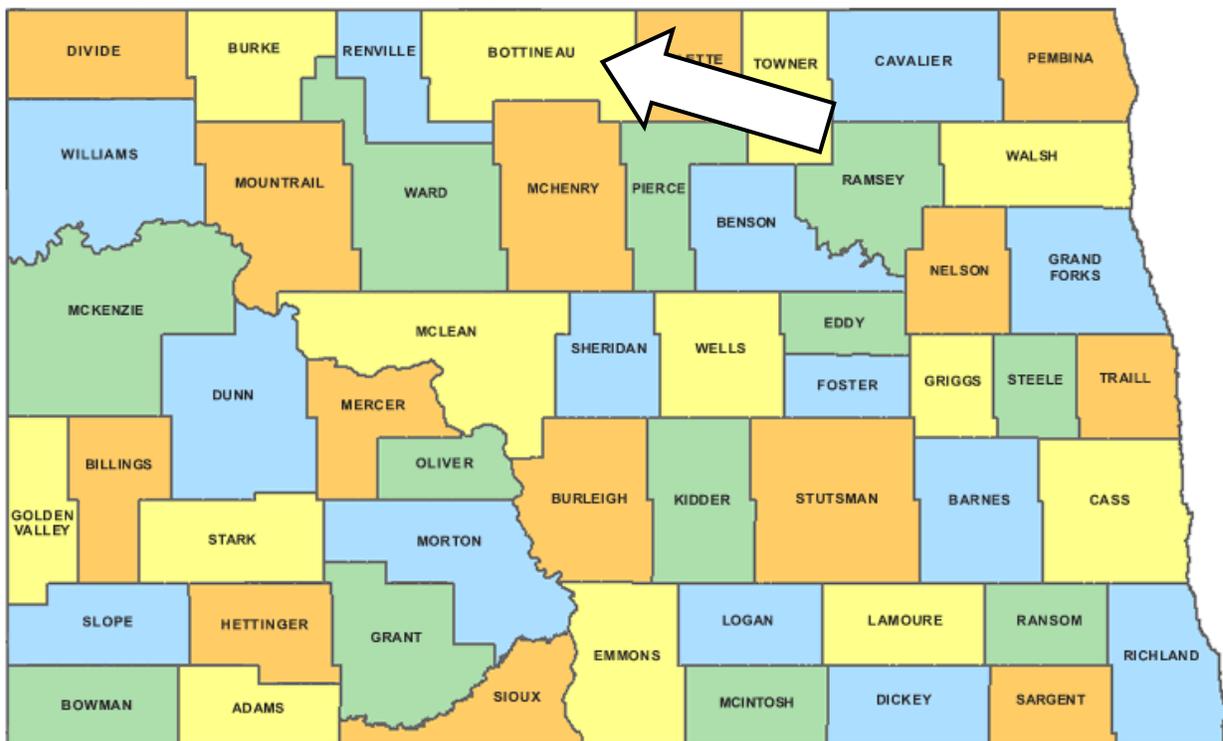
1.4 County and Jurisdictional Overview

Bottineau County is located in north central North Dakota as shown in Figure 1.4A. Bottineau County is bounded by Canada on the north, Renville County on the west, McHenry and Pierce Counties on the south, and Rolette County on the east. The area is 1,697 square miles. The City of Bottineau is the county seat and other incorporated cities include Antler, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City. The county also has 45 incorporated townships and three unincorporated communities which are Carbury, Omemee, and Roth that use Bottineau County zoning practices.

Bottineau County had a 2013 estimated population of 6,736. The county’s population density is about 3.9 people per square mile. (<http://quickfacts.census.gov/qfd/states/38/38009.html>)

The market value of agricultural products sold in 2012 was \$254,032,000 making it the leading economic factor in Bottineau County. Source: ([http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1, Chapter 2 County Level/North Dakota/st38_2_001_001.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/North_Dakota/st38_2_001_001.pdf)). Merchant wholesaler sales in 2007 were \$135,017,000 which makes it the second economic factor in Bottineau County (US Census Bureau 2007). Retail Sales in 2007 in the county were \$56,982,000.

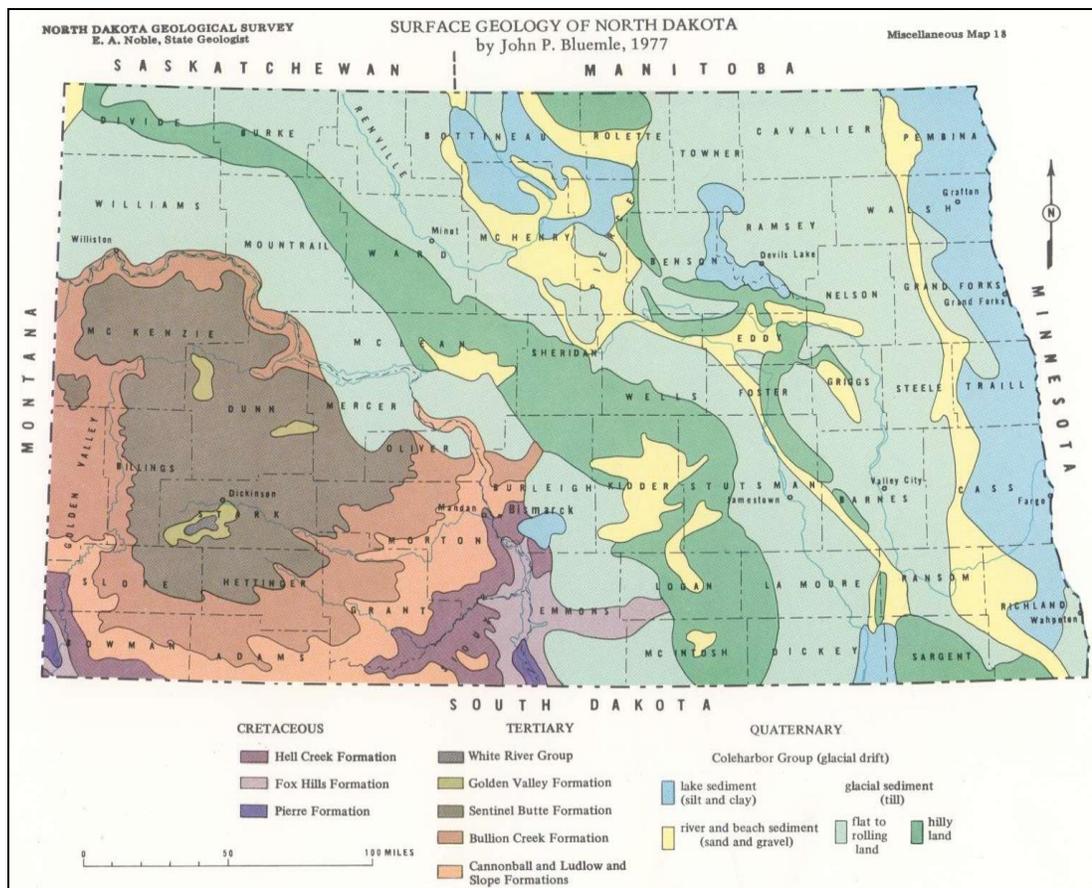
Figure 1.4A-Bottineau County



1.4.1 Geography

Figure 1.4B below depicts the surface geology of North Dakota and how it was influenced by glacial activity. One can see how Bottineau County fits into the whole picture of the state.

Figure 1.4A North Dakota Surface Geology

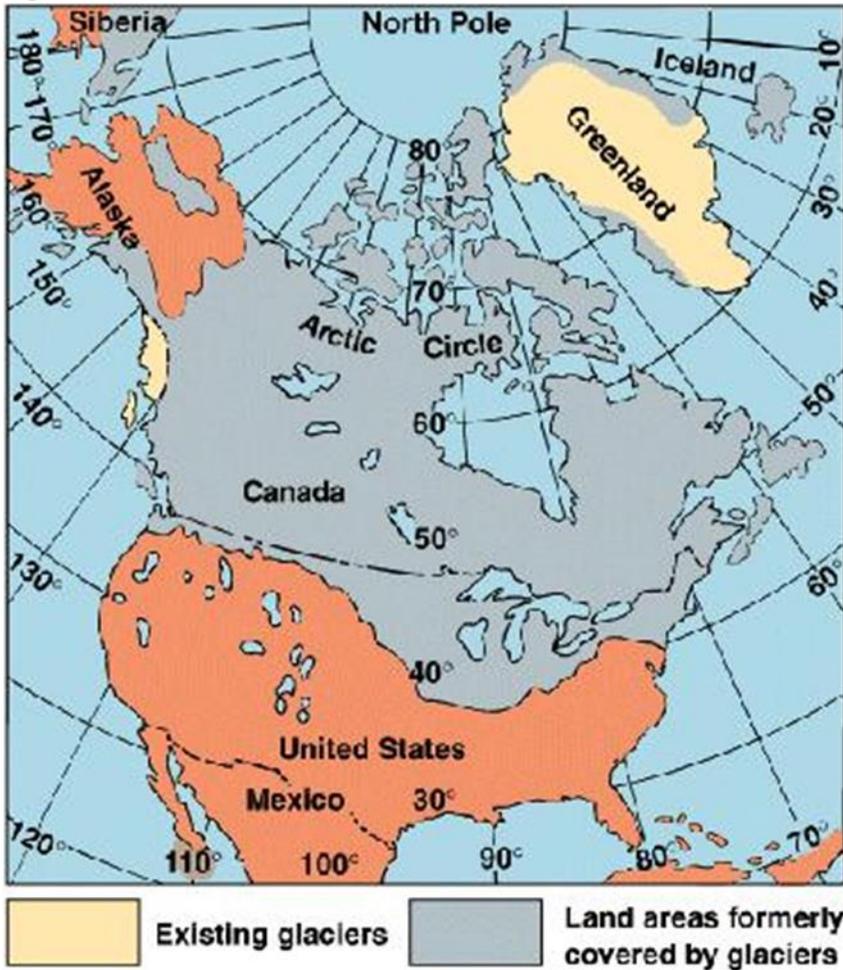


Source: North Dakota Geological Survey, 2015

Figure 1.4C below depicts Bottineau County’s geological formations. Land use today is influenced by these geological formations. The last Great Ice Age, which began about 1.6 million years ago, dramatically affected the geology and life of North Dakota and Bottineau County. Glaciers advanced into North Dakota from Canada on numerous occasions and extended as far south as the Missouri River during the last major glacial advance. When the glaciers melted, the sediment incorporated in the ice was deposited. Artifacts indicate that the first people to reside in North Dakota were here about 11,000 years ago. They were big game hunters preying on mammoths and other large mammals. The climate became warmer and drier between 8,500 and 4,500 years ago, the kinds of plants and animals that live in North Dakota today became established at that time. The glacial anticyclone depicts how Bottineau County was formed. The ice sheet pushed huge quantities of glacial till into what is now Bottineau County.

Figure 1.4B below is showing the locations of Pleistocene continental glaciers in the Northern Hemisphere.

Figure 1.4B Pleistocene Continental Glaciers



Source: <http://higheredbcs.wiley.com>.

Figure 1.4C Laurentide Ice Sheet

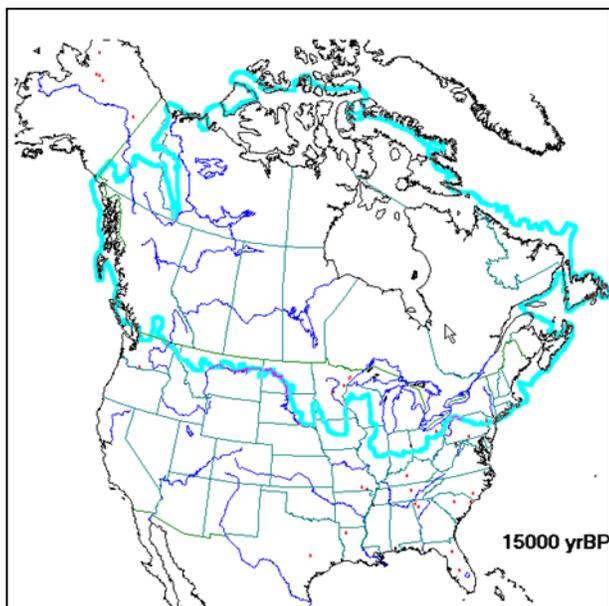
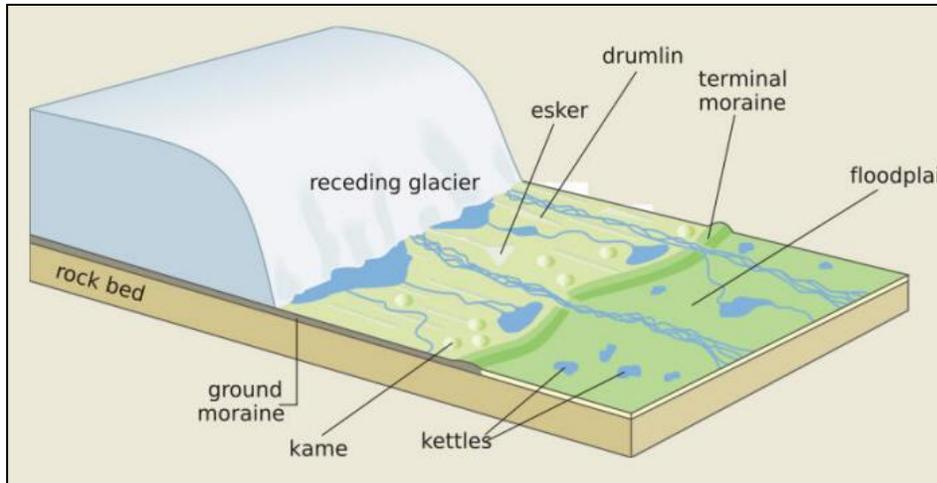


Figure 1.4C the right outlines in blue the extent of the Laurentide Ice Sheet 15,000 years ago. Geologists have found material left by the ice throughout this area, proving that virtually all of Canada and most of North Dakota including all of Bottineau County were once covered by thick glacial ice.

Source: www.ncdc.noaa.gov

Figure 1.4D outlines the glacial deposits and depicting their formation as glaciers retreated. These glacial features are common in Bottineau County.

Figure 1.4D Glacial Deposit Formation



Source: Hans Hillewart, 2014

Bottineau County is located in the upper reaches of North Dakota’s Drift Prairie Region. The Drift Prairie is located between the Red River Valley to the East and the Missouri Plateau to the West. It is called the Drift Prairie because it carries a surface layer or mantle of glacial drift. This plain is undulating to rolling, with occasional hills rising 150 to 200 feet above the general surface. Bottineau County has almost every glacial feature that is found on North Dakota’s Drift Prairie. The types of glacial drift in Bottineau County are till, outwash, ice contact deposits, lake deposits, and alluvium. The ice contact deposits are evident in the hilly region of eastern Bottineau County, particularly the Turtle Mountains.

In geographic terms, the topography of Turtle Mountain is due in part to erosion and in part to glacial deposition. There is also a theory that volcanic activity played a part in Turtle Mountain's formation, and warm springs on the mountain form the basis of this belief. Approximately two kilometers of sediment and sedimentary rocks overlie the Precambrian “basement” beneath Turtle Mountain. This overlay consists of layers of sand, silt and seams of lignite coal. Erosion over millions of years reduced the height of the mountain before glacial ice covered it.

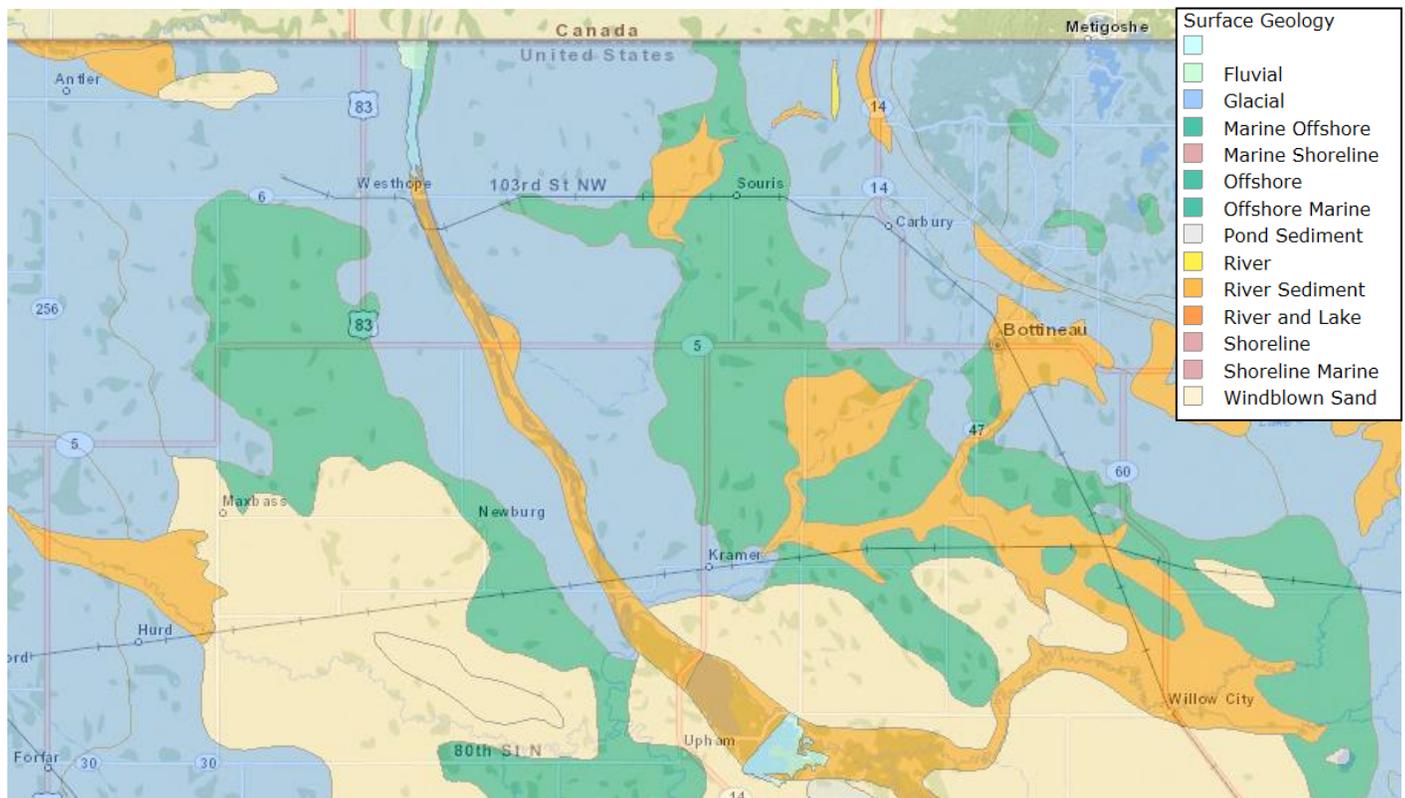
Figure 4.1E

The height of Turtle Mountain offers an expansive view over the prairie. CREDIT: Teyana Neufeld, TM-SPHA



As the ice thinned and melted with rising temperatures, debris that was carried by the glaciers was deposited over Turtle Mountain. These deposits measure about 150 meters in thickness and sit atop older deposits and the eroded base. By about 12,800 years ago Turtle Mountain was free of ice. As the glacier retreated it carved many shallow lakes and wetlands into the mountain and sculpted the gracefully rolling hills and dales. Ravines were carved by streams of rain and run-off waters flowing from the high forested altitudes to the low pasture plains.

Figure 1.4.F Bottineau County Geological Formations



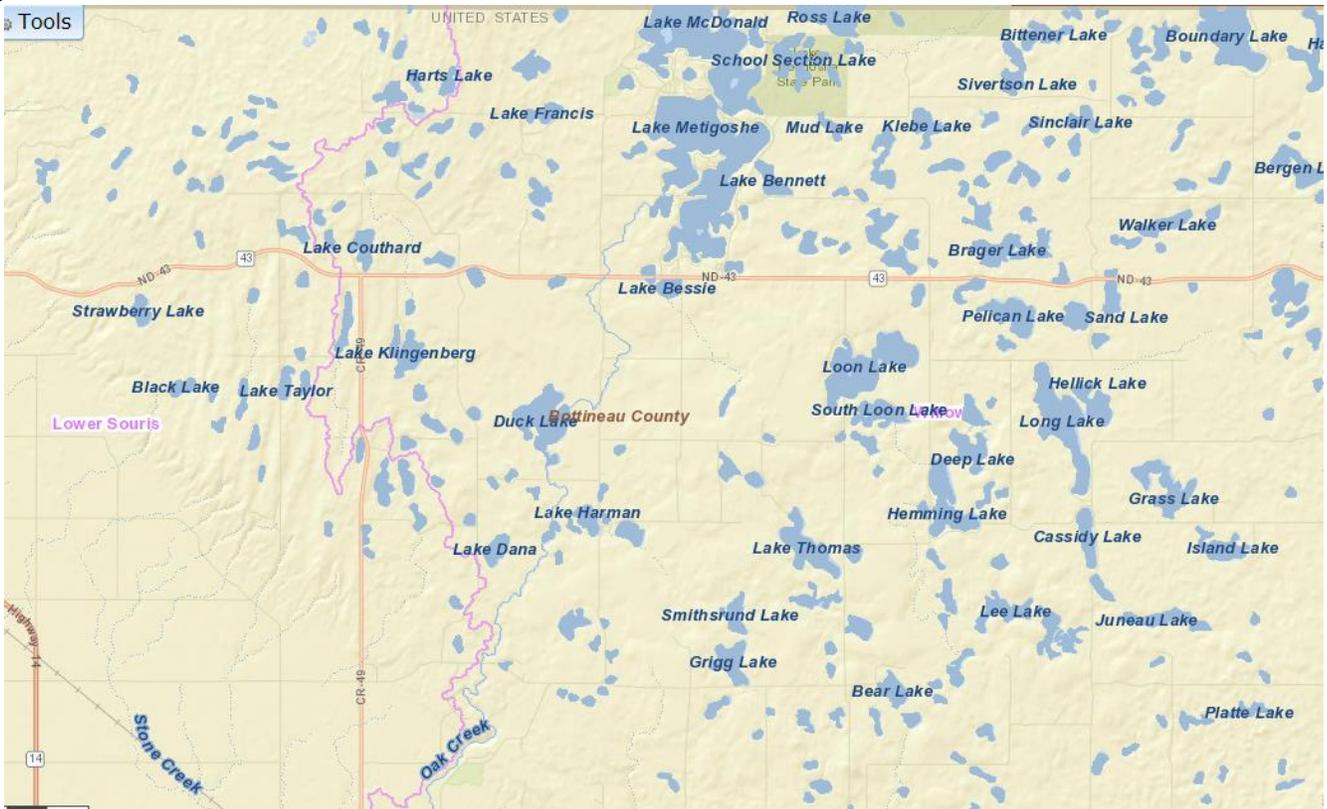
Source: ND GIS Hub, 2015

The entire county watershed runs into Canada by way of the Souris River through the Lower Souris, Deep, and Willow sub basins. The principal tributaries of the Souris (Mouse) in Bottineau County are Spring Coulee, the Cut Bank, Ox, Willow, Stone, and Boundary Creeks. Much of the area, although located within the drainage basins of the Souris River, is internally drained. There are over 40 named lakes in the Northeastern part of the county along the largest of which being Lake Metigoshe. Lakes, sloughs, and small ponds in the Northeastern portion of Bottineau County are remains of trapped glacial ice that melted as the glacier receded leaving a depression in the glacial till. When these depressions are deep enough to intersect the water table or have a drainage basin that is large enough to fill them with water, they may become permanent lakes or sloughs (Kettle Lakes). The quality of water varies considerably from one lake to another, and in each lake with wet and dry seasons. Most of the lakes contain moderately saline water from salts dissolved from the glacial till. Glacial drainage ways which carried away glacial melt water are

found throughout Bottineau County. The Souris River which was one of these glacial drainage ways; other drainage ways can be seen dotting the landscape in the form of creeks and coulees. Glacial lakes formed when glacial melt water had no drainage leaving behind sand and gravel deposits on their shorelines and flat, rich and fertile farmland on the lake bottom, similar to the land of the Red River Valley. The most significant of these lakes was glacial lake Souris.

Source: http://www.swc.nd.gov/4dlink9/4dcgi/GetSubContentPDF/PB-231/EddyBottineau_Part_3.pdf

Figure 1.4.G Turtle Mountain Area Lakes and Streams



Source: ND GIS Hub, 2015

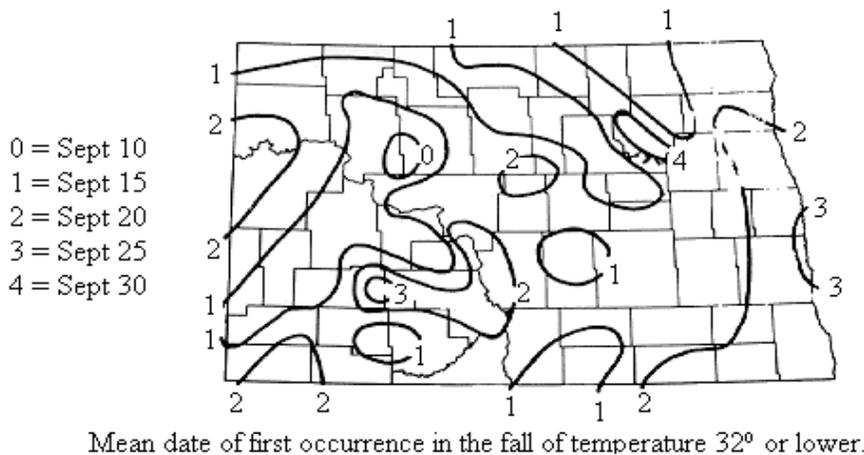
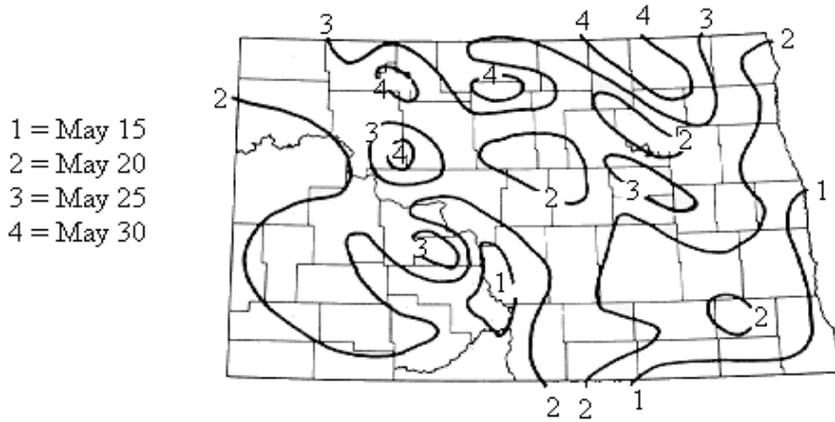
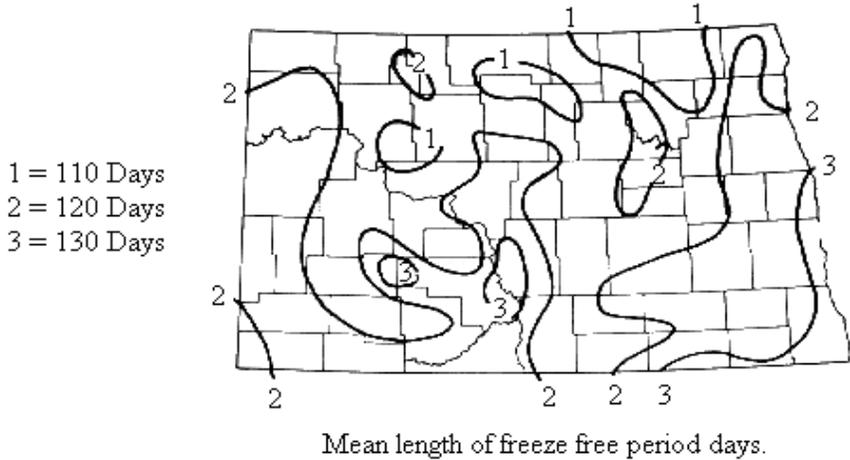
1.4.2 Climate

General

Climate is the average of weather conditions, as a factor in the environment. Climate underlies the production, distribution and exchange of commodities derived from both the plant and animal kingdoms; it influences methods of agriculture and the way of life of the citizens of Bottineau County. Bottineau County is located in the higher mid-latitudes. This results in incoming solar radiation being direct during the summer months and indirect during the winter months. The pattern of four different distinct seasons (spring, summer, fall, and winter) is characteristic of the middle latitudes. The length of day and night is also affected by the mid-latitude location. On June 21, the date of the summer solstice, the sun rises at 5:38 AM CDT and sets at 9:49 PM CDT resulting in over 16 hours of daylight. In contrast on December 21, the date of the winter solstice the sun rises

at 8:32 AM CST and sets at 4:47 PM CST resulting in just a little more than 8 hours of daylight. The long hours of sun exposure to plant life during the summer months speeds the growth in the relative short growing season of 110 days. Source: <http://www.npwrc.usgs.gov/resource/habitat/climate/figure23.htm>

Figure 1.4.2A, Growing Season Maps Maps showing length of freeze-free period, average date of 1st occurrence of 32° F or lower in the spring and the average date of first occurrence of 32° F or lower in the fall.



Latitude is not the only factor that affects the climate of Bottineau County. The Rocky Mountains to the west in Montana serve as a barrier between North Dakota and the Pacific Ocean blocking moist Pacific air from reaching the state reducing the potential rainfall and moderate temperatures we would otherwise experience. Furthermore the Rocky Mountains serve as a funnel for cold arctic air to slide east of the Rockies onto the Great Plains (including Bottineau County) giving Bottineau County cold winter temperatures. (National Weather Service, 2015)

Temperature

Bottineau County truly represents a continental climate with cold winters and hot summers. Summers are warm and pleasant with warm days and cool nights. January is typically the coldest month with an average January temperature average of 3.0 degrees Fahrenheit. The coldest temperature set for Bottineau County -50 degrees Fahrenheit set on January, 1993. July typically is the warmest month with an average temperature of 68 degrees Fahrenheit. The highest temperature recorded was 101 degrees Fahrenheit set on July 12, 1936. The record high temperature for North Dakota is held by Steele at 121 degrees Fahrenheit set on July 6, 1936. The record low temperature for North Dakota was set at Parshall on February 15, 1936 at -60 degrees Fahrenheit.

Source: National Weather Service <http://www.crh.noaa.gov/bis/> and

http://www.hprcc.unl.edu/data/historical/index.php?state=nd&action=select_state&submit=Select+State

The Turtle Mountains in Bottineau County average only 400 to 800 feet higher than the surrounding area; yet, their abrupt rise from the prairie plains produces significant irregularities in temperature patterns. Compression warms the prevailing northwesterly flow of air descending the southeastern slopes. On the other hand, cold air drainage into the lower reaches of the Souris river basin creates a cold pocket southwest of the mountains.

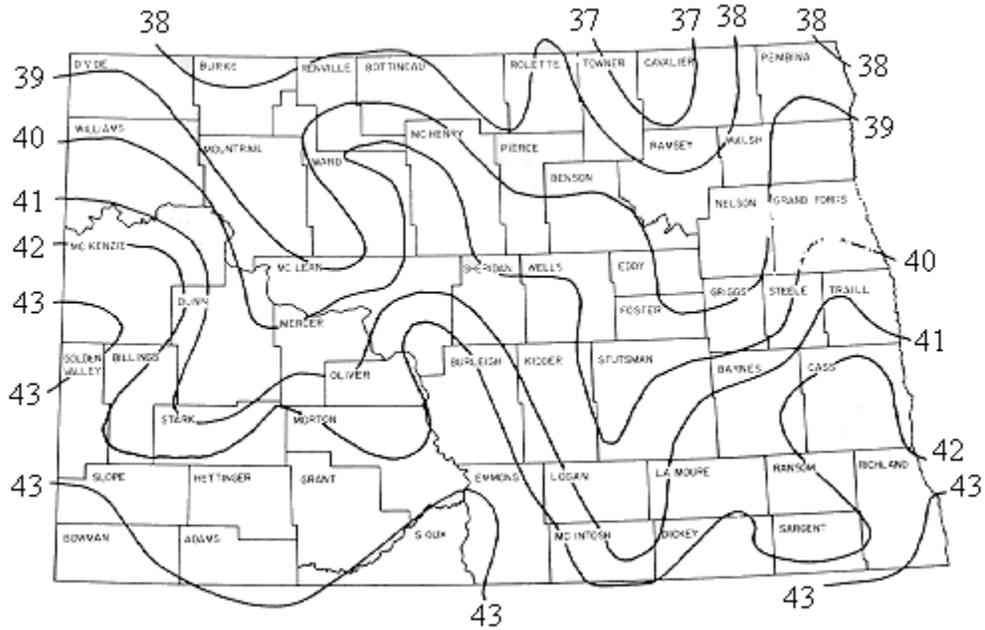


Figure 1.4.2D, Annual Mean Temperature.

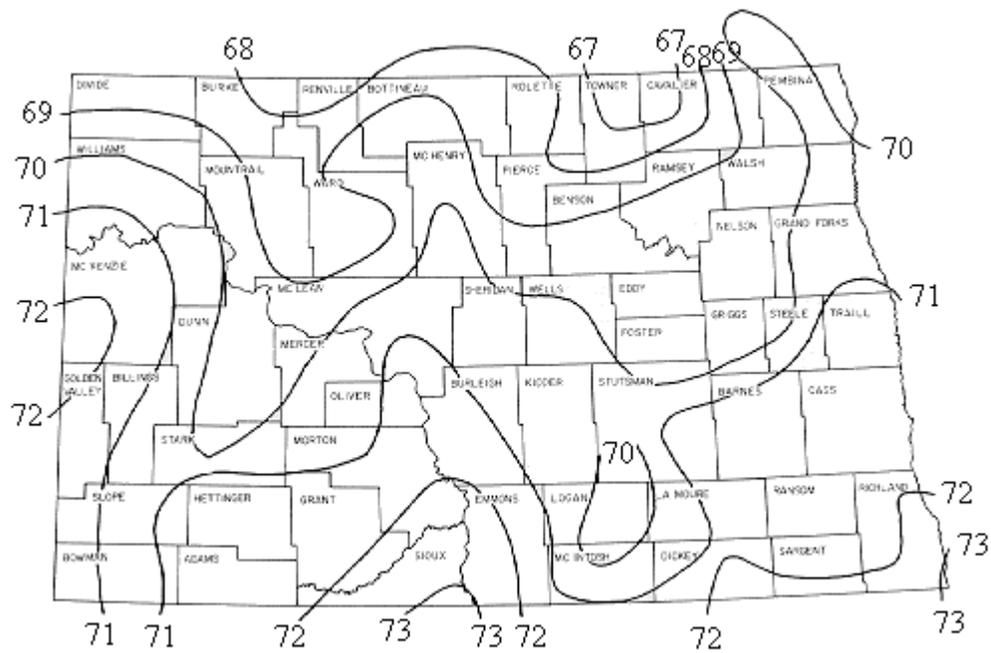


Figure 1.4.2E July Mean Temperature

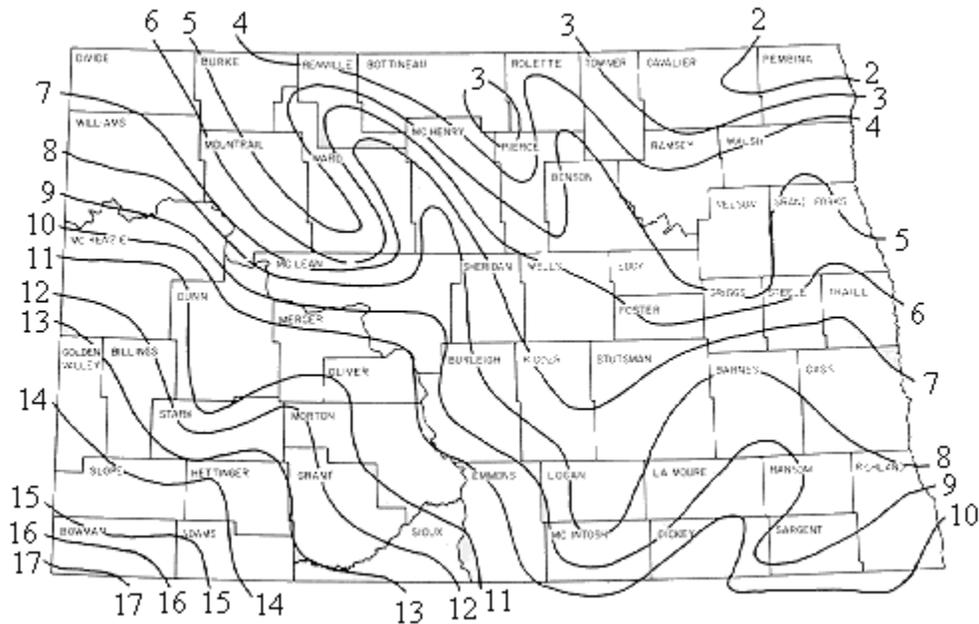


Figure 1.4.2F January Mean Temperature.

<http://www.npwrc.usgs.gov/resource/habitat/climate/figure1.htm>

Precipitation

Bottineau County’s average annual precipitation is 16.81 inches resulting in a semi-arid climate. The total precipitation is not large but more than three-fourths of the annual precipitation typically falls during the growing season. About half of the precipitation typically falls during May, June, and July. February typically is the driest month with only .40 inches of precipitation while June typically is the wettest with 3.43 inches of precipitation. The wettest year was 2010 with 30.44 inches of precipitation; June of 1944 was the wettest month with 12.03 inches of precipitation. 1936 is the driest year on record with 8.45 inches of precipitation. Snowfall amounts average 31.4 inches per winter season. The lowest amount of snowfall was the winter of 1914-1915 with 7.4 inches of snow while the winter of 2010-2011 had the largest amount of snow, 75.2 inches. The month with the average highest snowfall amount is March with 5.0 inches of snow. Daily records are 3.45 inches of precipitation falling on June 23, 1923 while the maximum snowfall for a day was 11.0 inches on March 6, 1944. Source: National Weather Service - <http://www.crh.noaa.gov/bis/> and http://www.hprcc.unl.edu/data/historical/index.php?state=nd&action=select_state&submit=Select+State

Wind

The average wind velocity is about 10 miles per hour. The most common single wind direction is the North West, but the county gets winds from every direction of the compass. The highest 5-second

average wind speed is 58 mph set on July 12, 2004. The highest average wind speed is 40.4 mph set on December 5, 1995. The highest average daily wind speed is 30.6 mph set on April 5, 1997.

dsssSource: National Weather Service - <http://www.crh.noaa.gov/bis/http://ndawn.ndsu.nodak.edu/station-info.html?station=12>

Figure 1.4.2G

<i>Climate Data</i>														
Statistic	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Minimum Temperature	°F	-7.8	-0.1	12.8	27.6	40.6	49.9	54.0	52.0	41.5	29.1	13.6	-1.7	25.96
Maximum Temperature	°F	13.8	21.1	32.9	51.7	66.9	74.8	79.4	78.9	67.3	53.7	32.8	18.7	49.33
Heating Degree Days		1924	1528	1306	760	370	151	66	111	333	732	1254	1753	857.33
Cooling Degree Days		0	0	0	0	22	71	118	124	15	0	0	0	29.17
Monthly Precipitation	inches	0.49	0.46	0.79	1.22	2.16	3.29	3.04	2.62	1.94	1.27	0.66	0.51	1.56

First and Last Frost Dates

First Frost			Last Frost		
10%	50%	90%	10%	50%	90%
SEP 11	SEP 21	OCT 01	MAY 05	MAY 17	MAY 29
Explanation of frost dates.					

Source: <http://www.hprcc.unl.edu/stations/index.php>

Figure 1.4.2H

BOTTINEAU, NORTH DAKOTA (320941)

Period of Record : 1/ 1/1893 to 3/31/2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	12.9	18.1	31.4	51.5	65.3	74.2	80.6	79.3	68.3	54.6	33.9	19.2	49.1
Average Min. Temperature (F)	-7.9	-2.9	10.8	27.9	39.7	49.7	54.7	51.9	41.8	29.6	14.2	-0.6	25.7
Average Total Precipitation (in.)	0.45	0.40	0.69	1.02	2.14	3.43	2.55	2.46	1.56	1.09	0.54	0.48	16.81
Average Total SnowFall (in.)	6.1	4.4	5.0	2.6	0.5	0.0	0.0	0.0	0.1	1.6	4.9	6.1	31.4
Average Snow Depth (in.)	9	10	6	1	0	0	0	0	0	0	1	5	3

Source: <http://www.hprcc.unl.edu/stations/index.php> High Plains Regional Climate Center

Climate Conclusion

Bottineau County experiences a typical continental climate with cold winters and warm summers. Precipitation is about average for North Dakota. The factors that make up the climate of Bottineau County result in sometimes violent and damaging weather systems. Included among these are high winds, tornadoes, thunderstorms, floods, excessive heat, excessive cold, blizzards, drought, hail, sleet, and freezing rainfall. The frequency of these severe weather events and damages are explained in Section 4.

1.5 County History

Bottineau County was founded in 1883. It is named for Pierre Bottineau, a pioneer hunter and trapper who later became a successful land speculator. The city of Bottineau became the county seat and was originally plotted 1.5 miles north of its current location but was moved in 1887 when the Great Northern Railway laid its original track.

Prior to the white settlement of Bottineau County, the land was occupied by the Chippewa Native American Indian Tribe. The Turtle Mountain Band of Chippewa originated in Wisconsin and Minnesota and migrated to the Turtle Mountains because the climate, flora, and fauna were similar to their native lands. In addition they could go out on the nearby prairie to hunt the American Bison which provided much of their food and other materials such as hides. The Canadian fur traders of both British and French origin both made contact with the Chippewa and found them friendly to trade with for manufactured goods in exchange for hides and furs. It was common for the fur traders to marry Chippewa women. The children of these unions were not widely accepted by the white culture or the Chippewa culture and formed their own culture known as the "Metis". The "Metis" were American Bison hunters transporting the hides to St. Paul, Minnesota by carts known as the "Red River Cart".

The settlement of Bottineau County by people from eastern states and European immigrants on a large scale began with the building of the railroads across North Dakota. The three major railroads that were built in North Dakota were the Northern Pacific, Great Northern, and the Minneapolis, St. Paul, and Sault Sainte Marie Railroad which later became known as the Soo Line. The purpose of these lines was to haul agricultural products to the main line from whence these products went to eastern markets. In return, North Dakotans purchased products that were manufactured in the east and shipped by railroad to the cities.

The Northern Pacific was the first railroad to enter the state, reaching Fargo in 1872 and Bismarck in 1873. In 1887, the Manitoba Line extended its main East/West line with a North/South branch connecting Bottineau to Rugby. The Manitoba line leased its track to the newly formed Great Northern Railway Company in 1890; of which both companies were owned by the railroad magnate James J Hill. Eventually two main railroads developed through Bottineau County, the Sault St. Marie, which had a main line running through Gardena, Kramer, and Lansford; the other was the Great Northern Railroad which had three lines sprouting north from the 'Highway 2' main line. One serviced the eastern portion of the county (Willow

City, Bottineau, Antler), another serviced south central Bottineau (Newburg, Maxbass), and the third serviced the western portion of the county (Lansford).

<http://history.nd.gov/hp/PDFinfo/Railroads%20in%20North%20Dakota,%201872-1956.pdf>. The Northern Pacific Railroad today is part of the Burlington, Northern and Santa Fe Railroad. In 1987 this line became part of the Red River Valley and Western Railroad.

Figure 1.5A, Minneapolis St. Paul & Sault St. Marie

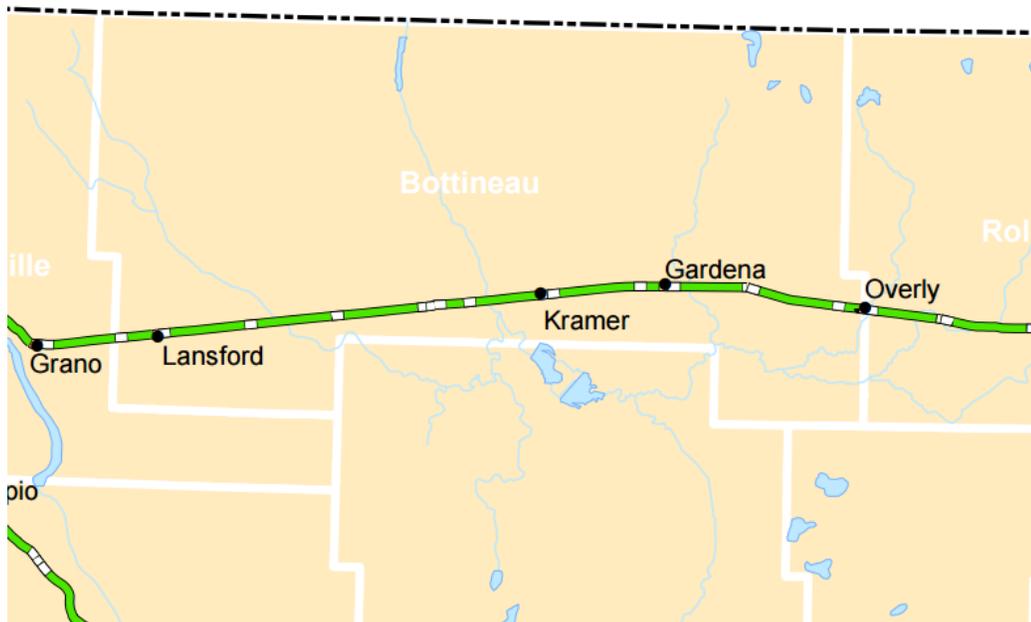
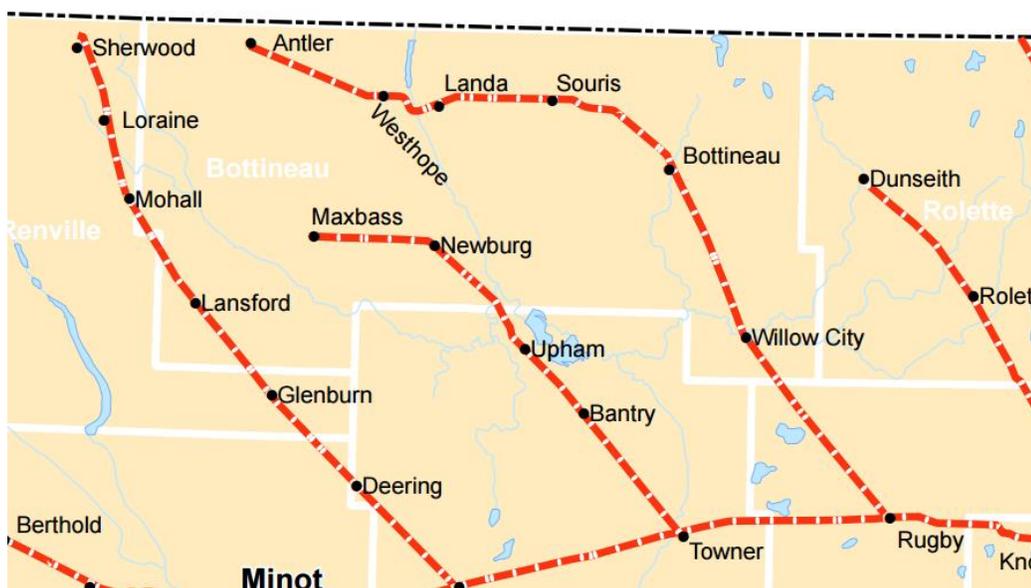


Figure 1.5B, Great Northern Railroad (1914)



The settlement of Bottineau County occurred in earnest in the late 1880's and continued into the early 1900's. The settlers included a variety of people attracted to free land through the Homestead Act or to purchase cheap land from the railroads. The settlers came from eastern states, European nations of Norway, Ireland, England, Germany, Russia, and other countries; there is a major French population in the county as the area was popular with fur traders before the major settlement began. The original railroad steam engines had to stop every 10 miles or so to fill with water. At these stops towns developed as passengers could get on or off the train; grain, cream, and livestock could be loaded, and commodities from eastern markets could be unloaded. The towns attracted merchants that established banks, doctor's offices, general stores, hardware stores, clothing stores, creameries, churches, and places of entertainment.

1.6 Summary of Hazards

All of the factors above are important when examining the county's vulnerability to hazards. Fourteen hazards are identified in this plan as having a significant potential threat to the people, environment, and economy of Bottineau County. These hazards are:

- Communicable Disease (including human, animal, and plant diseases)
- Dam Failure
- Drought
- Flood (including riverine, levee failure, closed basin, ice jam, and flash floods)
- Geologic Hazards (including landslide, earthquake, and other geologic/mining hazards)
- Hazardous Material Release (including impacts from the oil and gas industry)
- Homeland Security Incident (including multiple types of terrorism and cyber-terrorism)
- Severe Summer Weather (including tornadoes, hail, downbursts, thunderstorm winds, lightning, and extreme heat)
- Severe Winter Weather (including blizzards, heavy snow, ice storms, and extreme cold)
- Shortage or Outage of Critical Materials or Infrastructure
- Transportation Accident (including vehicular, railway, and aircraft accidents)
- Urban Fire or Structure Collapse
- Wildland Fire
- Windstorm

Additional hazards may exist that were not apparent to the mitigation team or stakeholders through the development of this plan, and certainly, disasters can occur in unexpected ways. Although any and all hazards cannot be fully mitigated, hopefully, this plan will help the communities of Bottineau County understand the hazards better and work towards a more disaster resilient County.

2. PLANNING PROCESS AND METHODOLOGIES

Mitigation planning is a community effort. It also takes time and expertise. For Bottineau County and the Cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City, the townships, and the unincorporated communities an effective hazard mitigation plan requires input from a variety of stakeholders, including elected officials, emergency responders, emergency management, health care providers, public works, road officials, state and federal agencies, businesses, and the public. Following a disaster, many of these stakeholders will be overwhelmed with recovery responsibilities. Therefore, planning for mitigation and involving as many stakeholders as possible before a disaster strikes will make mitigation activities easier following a disaster and may even prevent the disaster in the first place!

The key to the development of a sound mitigation plan is the establishment of essential elements of the planning process. The following are some of the elements used to develop this plan:

- Identify the types of natural and human-caused hazards that affect the county and develop a brief history for each.
- Determine the present and future risk and vulnerability of Bottineau County citizens to these hazards.
- Determine our present capability to perform hazard mitigation at the local and county levels.
- Establish and prioritize the major hazard mitigation issues that should be addressed.
- Determine mitigation measures and strategies for addressing and reducing the county's vulnerability to present and future hazards.
- Outline a system for managing and improving mitigation programs at the county level.

2.1 Planning Steps

2.1.1. Planning Tasks

The planning steps closely followed the guidance outlined in FEMA's *Local Mitigation Planning Handbook* dated March 2013. The handbook outlines nine tasks to follow in the completion of the Hazard Mitigation Plan. They are:

1. **Task 1** - Determine the Planning Area and Resources

Bottineau County determined the planning area and overall scope of the planning project. Building on existing planning efforts and working with other entities were common approaches to defining the planning area. Identifying the plan's local lead and the need for outside technical assistance were important first steps in organizing the resources. In this multi-jurisdictional plan which calls for mitigation at the township, city, or county level all jurisdictions share the same commitment to developing a plan to reduce risks from hazards in their communities. These jurisdictions include Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City, the townships, and the unincorporated communities.

2. **Task 2** - Build the Planning Team

The important activity of this task was to identify and engage the planning team. The planning process is as important as the plan itself, and the planning team helps shape and guide that process. Involving a variety of stakeholders creates a more varied approach to the hazards and impacts and mitigation, which could lead to the county feeling less of an impact when an event occurs or could potentially prevent the event from escalating to a disaster as well as improving Bottineau County's recovery from an event. Invited to serve on the Planning Team were representatives of the County Commission, representatives of the 12 cities; Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City, the townships, and the unincorporated communities; representatives of the nine fire departments: Antler Fire Department, Bottineau Fire Department, Kramer Fire Department, Lansford Fire Department, Maxbass Fire Department, Newburg Fire Department, Souris Fire Department, Westhope Fire and Rescue, Willow City Protection District. The St. Andrew Health Care Hospital in Bottineau was invited along with the Ambulance Services of Bottineau, Mohall Maxbass, and Westhope. The Bottineau County Emergency Manager, Bottineau County Agent, Bottineau County Highway Engineer, Bottineau County Planner, Bottineau County Public Health, Bottineau County Treasurer, Bottineau County Risk Manager, Bottineau County Sheriff, Bottineau County Tax Equalization Director, Bottineau County 911 Coordinator, the Public Works of Antler, Bottineau, Kramer, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City. Bottineau County Social Services Director, Bottineau County Water Board, Bottineau County Weed Board, National Weather Service, Emergency Managers from neighboring counties of Renville, Ward, McHenry, Pierce, and Rolette; Cable and Telephone Companies (UTMA-SRT-Midcontinent) Utilities, All-Seasons Rural Water District, North-Central Ottertail Cooperative Electric Cooperative, and First District Health were also invited. Al Hanson the North Dakota Department of Emergency Services Northwest Regional Coordinator. The reason for this broad spectrum of individuals was to form a broad basis for the planning team. Each has a role in mitigation planning and has input for a successful mitigation plan. Regularity agencies were included to offer specific oversight to the planning process and to provide input on their area of expertise. The emergency manager and the contractor Wenck Inc. consulted with them during the planning process on planning topics as necessary.

All incorporated cities had representation at one or all of the meetings to update the plan. The city of Overly received all invitations to participate. However, no representation from the city of Overly was received.

3. **Task 3** - Create an Outreach Strategy

Identifying how to involve stakeholders and the public is an important aspect of mitigation planning. An open public involvement process is essential to the development of an effective plan. This is achieved through the use of newspaper articles, radio news stories, social media, and the county/city websites. The documentation of these efforts ensures that the whole community understands how decisions were reached.

4. **Task 4** - Review Community Capabilities

Conducting an assessment of existing plans, policies, studies, and programs was completed to identify the mitigation actions. Local capability for mitigation can vary significantly from

community to community. In the development of multi-jurisdictional hazard mitigation plans, local governments with limited capacity or capability may use the planning process as a means to develop cooperative agreements, mutual aid agreements, or service agreements that enhance their capacity to undertake mitigation activities. Understanding what capabilities need to be changed or enhanced to reduce disaster losses allowed the planning team to address those shortfalls in the mitigation strategy. The main plan that was reviewed as was the Local Emergency Operations Plan as other plans such as the Economic Development Plan. The Local Emergency Operations Plan was valuable in identifying the roles and responsibilities of officials and agencies during emergency/disaster conditions. These officials/agencies had insights into Hazard Mitigation Plan development. The current Multi-Hazard Mitigation Plan was considered to be out of date; it was last modified in April of 2010.

5. **Task 5** - Conduct a Risk Assessment
Completion of the local risk assessment was completed by describing the hazards, identifying community assets, analyzing the risks or impacts of the hazards to those assets, and summarizing the results and overall vulnerability of the community.

6. **Task 6** - Develop a Mitigation Strategy
In the planning process, developing a comprehensive mitigation strategy that is integrated with existing plans and programs in the community was important. These mitigation goals and actions established a path forward for creating a safer, more disaster resilient community.

7. **Task 7** - Keep the Plan Current
Describing the requirements and recommendations for documenting how, when, and by whom the mitigation plan will be maintained over time is important to the plan development process. Identifying and adhering to monitoring and evaluation procedures will make the 5-year update process easier and more effective. The emergency manager will call a Hazard Mitigation Planning Committee meeting annually to review the plan and update the plan as necessary to include adding newly identified mitigation projects as County conditions change.

8. **Task 8** - Review and Adopt the Plan
Incorporating feedback from the planning team, stakeholders, and the public on the final plan document is the first phase of reviewing and adopting the plan. A description of the final review and adoption of the plan document by the community and the process for FEMA plan approval is described in the plan. Details are described in Section 2.1.2.

9. **Task 9** – Create a Safe and Resilient Community
The local mitigation plan is the representation of Bottineau County’s commitment to reducing long-term vulnerability and acts as a guide for decision makers as they commit resources for implementation. The planning process does not stop at adoption. Funding and resources are available to implement your plan. Proactively implementing the policies and actions identified in the mitigation plan increases community resilience and is an investment in Bottineau County’s future safety and sustainability. The process of monitoring and maintaining is outlined in Section 6, Plan Monitoring and Maintenance.

2.1.2 Approval and Adoption Processes

Task 8 discusses the process to review and adopt the revised Plan. The Bottineau County Commission was responsible for approving and adopting the 2015 Hazard Mitigation Plan Update. The Bottineau County Commission reviewed and approved the Plan Revision on December 1, 2015.

The cities in Bottineau County reviewed and adopted the plan as follows:

- Antler: December 7, 2015
- Bottineau: December 7, 2015
- Gardena: December 7, 2015
- Kramer: December 7, 2015

Landa:	December 1, 2015
Lansford:	December 14, 2015
Maxbass:	November 12, 2015
Newburg:	November 20, 2015
Overly:	November 15, 2015
Souris:	December 5, 2015
Westhope:	December 7, 2015
Willow City:	December 4, 2015

Adoption documentation is available in Appendix F.

2.2 Initial Planning Process

Mitigation planning in Bottineau County began with the adoption of the 2009 Multi-Hazard Mitigation Plan. Since that time, multiple revisions have been made to the county’s mitigation plan as a result of the annual review. The 2010 Multi-Hazard Mitigation Plan expired in April of 2015, and the development of an updated plan was necessary.

Mitigation was specifically discussed at county commission meetings, and any public hearing where the general public, including businesses, were present. Input from the private sector was solicited through invitations to public hearings. All public meetings and hearings were publicized in the local newspaper to assure public awareness. Many mitigation projects impact the business community, and therefore, businesses were involved in all phases of the planning process.

Public input into the Multi-Hazard Mitigation Plan developed in 2010 included the following:

- Multiple public meetings in Bottineau, where the public was invited
- Meetings with Bottineau Public Works and the City Engineers
- Meetings with the Bottineau County Water Resource District
- Regular meetings with law enforcement, police, fire, and emergency medical services
- Countywide meetings of all emergency responders
- Correspondence with all government entities requesting their input
- Input from the Fire Departments for urban and rural fire mitigation
- Meetings with representatives of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City, the townships, and the unincorporated communities

2.3 Plan Update Process

In 2015, Bottineau County, through a Pre-Disaster Mitigation (PDM) grant, hired a consultant to develop its Multi-Hazard Mitigation Plan. Wenck Associates, Inc., Mandan, North Dakota with experience in hazard mitigation and emergency management coordinated the planning process in partnership with the county. The contract was managed by Bottineau Emergency Management. Emergency management staff contributed many hours to gathering input from stakeholders and working with the contractor.

Each jurisdiction provided a point-of-contact for the update of the Multi-Hazard Mitigation Plan. Table 2.3A lists the 2014-2015 Point-of-Contacts. The Point-of-Contacts discussed the plan at public meetings with elected officials, filled out a questionnaire for their jurisdictions regarding updates they would like to see to the plan and mitigation activities conducted over the past five years, reviewed the draft plan, and accepted and passed on comments from the public and other officials. This information was discussed primarily at public meetings as shown in Table 2.3B. Meeting minutes can be found in Appendix B.

Table 2.3A Jurisdictional Mitigation Point-of-Contacts

Jurisdiction	Name	Title	Email	Phone
Bottineau County	Rick Hummel	Emergency Manager		701-228-5916
Bottineau	Penny Nostdahl	City Auditor		701-228-3232
Antler	Bruce Hanson	Mayor		701-267-3674
Gardena	Ken Loe	Mayor		701-228-2260
Kramer	Myron Hanson	Mayor		701-243-6386
Landa	Craig George	Mayor		701-295-2262
Lansford	Shawn Nett	Mayor		701-784-5540
Maxbass	Kevin Naumann	Mayor		701-268-3283
Newburg	William Deschamp	Mayor		701-272-6334
Overly	Harvey Wittmayer	Mayor		701-366-4404
Souris	Holly Gimbel	Auditor		701-243-6377
Westhope	Margo Helgeson	Mayor		701-245-6316
Willow City	William Fercho	Mayor		701-366-4306

Note: Email and phone contact information were redacted due to respect of privacy for plan participants.

Table 2.3B Public Meetings

Jurisdiction	Date
Bottineau County Hazard Mitigation Plan, Kick-Off Meeting	March 17 th , 2015
Bottineau County Multi-Hazard Mitigation Plan, Planning Meeting	April 29 th , 2015
Bottineau County Multi-Hazard Mitigation Plan, Planning Meeting	
Bottineau County Multi-Hazard Mitigation Plan, Planning Meeting	

Information from existing plans, studies, reports, and technical information related to hazards, mitigation, and community planning was gathered by Wenck Associates, Inc. by contacting individuals throughout the planning process and reviewing the 2009 plan. Many national and state plans, reports, and studies provided background information. Table 2.3C lists the existing local plans and documents incorporated into this mitigation plan by integrating information into the appropriate sections. Mapping for and updating of the plan was done by Wenck Associates, Inc. based on information collected from a wide variety of sources, including the 2009 plan and subject matter experts. The information was organized into a clear, usable, and maintainable format for the county that also ensured the federal regulations regarding hazard mitigation plans were met.

Table 2.3C Existing Local Plans and Documents Incorporated

Plan/Report/Study Name	Plan/Document Date
Bottineau County Hazard Mitigation Plan	2010
Bottineau County Hazardous Materials Emergency Response Plan	
Bottineau County Local Emergency Operations Plan	
Bottineau County Public Health Emergency Operations Plan	
Bottineau County EOC Operations Plan	
North Dakota State Multi-Hazard Mitigation Plan	
Bottineau County Terrorism Annex	
Bottineau County Mass Care Plan	
Minimum Care Facility Plan	

The five-year update of the plan featured a complete overhaul of all sections to improve readability, usability, and methodologies. Specifically, the following major changes were part of the plan’s update:

- A complete review of the 2009 plan; extraneous information was removed or placed in the appropriate new section.
- Updates and improvements to all sections of the previous plan.
- Re-Formatting Document
- Incorporation of information and comments collected at stakeholder meetings and through other means.
- Details regarding the county and community planning mechanisms and roles and responsibilities were added.
- Changes to and additional documentation of the hazard analysis and loss estimation methodologies.
- Update of the historical, facility, infrastructure, and development data.
- Additional GIS mapping using new and updated data.
- New hazards were identified and others were modified.
- More detail was added to each hazard profile, including updated and more detailed descriptions, histories, probabilities, magnitudes, maps, vulnerabilities, data limitations, and other factors.
- Mitigation goals, objectives, and projects were reorganized to clearly separate the three distinct requirements.
- New mitigation strategies and concepts were added and those completed or no longer relevant were removed.
- The projects were more specifically prioritized based on the STAPLEE method of analysis.
- The plan maintenance procedures were updated with an emphasis on post-disaster reviews.
- New appendices were added and extraneous information was removed.

Each jurisdiction participated in the plan’s update by participating in public meetings, providing data and information, reviewing the plan, and/or adopting the updated plan. The jurisdictions advertised the public meetings using their usual public notification procedures, typically by posting meeting agendas and newspaper notices. The county commission and city council meetings in which the governing bodies considered and adopted this plan were open, public meetings.

The draft plan was posted on the Bottineau County website for review and public comments were accepted. Each section was reviewed individually by hazard experts, stakeholders, and members of the community. A public meeting for residents of all jurisdictions was held on May 20, 2015 in Bottineau to review the final draft of the Multi-Hazard Mitigation Plan. This meeting was advertised in the Bottineau County Courant and Sunny 101.9FM Radio Station. Hard copies of the plan and website information were available at the meeting. Prior mitigation projects were discussed and future mitigation projects were identified at the meeting. All comments were recorded, received consideration, and changes to the plan were made where applicable.

The Bottineau County Multi-Hazard Mitigation Plan is a living, expandable document that will have new information added and changes made as needed. The plan's purpose is to improve disaster resistance through projects and programs, and therefore, opportunities for changes and public involvement will exist as disasters occur and mitigation continues. Details on the plan's maintenance and continued public involvement are further outlined in Section 6.

2.4 Roles and Responsibilities

2.4.1 County Officials

Bottineau County Government follows the North Dakota Constitution and North Dakota Law, therefore has established the following County officials. Their duties are listed below:

Auditor

The Auditor is responsible for a broad range of administrative duties. The primary duties are chief financial officer, elections officer and secretary to the county commission. Additional duties may include maintaining inventory of fixed assets, administering insurance coverage for county property, binding and storage of the official county newspaper as county record, and coordinating licenses and fees, such as hunting and fishing licenses, beer and liquor licenses, bingo and raffle permits.

City Government

The governing body of a city operating under the modern council form of government is the city council, which is composed of not less than four members, one of whom is the mayor, all elected at large or by wards. Candidates for the council shall run for either mayor or council member but not both at the same time. The terms of members of the council shall be four years, or until their successors are elected and qualified. However, the council shall establish by ordinance a procedure whereby one-half of all council members, as nearly as is practicable, are elected biennially.

Clerk of District Court

The Clerk of District Court's primary responsibility is administration of court records, but they also summon jurors, maintain exhibits and attend court when it is in session. They also issue passports, birth certificates and death certificates. There are four courts in Bottineau County: Administration, Civil, Criminal, and Juvenile.

Coroner

The role of the Coroner includes coordination of services to confirm and certify the deaths of an individual in Bottineau County. The Coroner also conducts or orders an investigation into the manner or cause of death, and investigate or confirm the identity of an unknown person who has been found dead within Bottineau County. The Coroner's office maintains death records of those who have died within Bottineau County.

County Commissioners

The Board of County Commissioners serves as the elected ruling body of the county government structure. The Bottineau County Commission is made up of three members and typically meet twice a month or as the need arises may call special meetings as determined by the commission. Commissioners in Bottineau County are elected at large. The Commission is responsible for administrative decisions for the county including their responsibility for the county budget, county road department, social service administration, appointments of many offices, and many other county concerns.

Emergency Manager and Assistant Emergency Manager

The role of the Emergency Manager includes the coordination of services to provide adequate response to any disaster or potential disaster in their county. To do this, the Emergency Manager coordinates activities necessary to mitigate, plan for, respond to, and recover from any emergency or disaster that may occur in the county.

Extension Service

The purpose of the Extension Service is to create learning partnerships that help adults and youth enhance their lives and communities. To accomplish this, the Bottineau County (NDSU) agents strive to have the Bottineau County (NDSU) Extension Service be the premier lifelong education network that helps Bottineau County Citizens improve their quality of life. The agents develop educational resources to address the issues and needs of Bottineau County citizens.

Highway Superintendent

The Highway Superintendent's primary role is to make recommendations to the County Commission for county highway maintenance and upkeep. The Highway Superintendent supervises county road maintenance crews and construction firms on maintaining, planning, and providing for the transportation needs of county residents.

Planning and Zoning Board

The Planning and Zoning Board's purpose is to promote the public health; safety and general welfare; to secure the orderly development of the county and to protect the natural resources of the county. The Planning and Zoning Board enforces the County Building Code, which is the International Building Code as amended by the State.

Public Health

Bottineau County Public Health provides personal and population based health services to residents in Bottineau County. The local public health infrastructure represents the capacity and expertise necessary to

carry out services and programs. The health unit offers an array of services. The most common activities and services provided by local public health are child immunizations, adult immunizations, treatment of the elderly, tobacco use preventions, high blood pressure screening, injury prevention screening, blood lead screening, Early and Periodic Screening Diagnosis and Treatment, Environmental Health, Emergency Preparedness, and West Nile Virus Surveillance, Car Seat Safety, home and school visits, WIC, family planning, and foot care clinics.

Recorder

The information filed and recorded in the County Recorder's office is used by the auditor, treasurer, commissioners and other county officials, along with the general public and business entities. These records primarily deal with real estate, such as patents, deeds, mortgages, bills of sale, security agreements, judgments, decrees, liens and certificates of sale.

School Districts

Four school districts serve Bottineau County being Bottineau, Newburg, Westhope, and Mohall-Lansford-Sherwood Co-op.

Sheriff

The Sheriff's duties include making arrests, enforcing all state and local laws, transporting prisoners and mentally ill patients, serving legal papers, holding public sales of property under court orders and attending district court.

Sheriffs have the authority to enforce laws in cities and towns as well as rural areas. While many of the responsibilities are regulated by the state and federal government, the Sheriff's primary role is still to preserve peace and order in the county.

Social Service Director

The County Social Service office is responsible for carrying out many direct services to citizens. These services include food stamps, health care assistance, housing and home energy assistance, Bottineau care, child/day care licensing, abuse and neglect intervention and many more ways to help people reach their maximum level of self-sufficiency.

State's Attorney

The State's Attorney serves as legal counsel and advisor to the county. The State's Attorney acts as prosecutor, representing the state in criminal cases. The office provides guidance to county commissioners and county officials in interpreting the North Dakota Century Code.

Tax Equalization Director

The responsibility of the Tax Equalization Director is to appraise all taxable property at a fair and equitable value. They also conduct educational campaigns to fully acquaint constituents with provisions of the property tax laws and responsibilities.

Treasurer

The Treasurer's office is used by taxpayers, state agencies, lending institutions and reality companies, providing easy access to tax and real estate records throughout the year to anyone who requests that information. Treasurers are responsible for keeping track of all property taxes, including delinquency and foreclosures, and act as accountant, financial manager and investor for the county.

Risk Manager

The Risk Management Division was established in 1995 to implement a program to address the State's exposures to tort liability claims and lawsuits due to the loss of sovereign immunity. Subsequently, in an effort to save premium dollars through a deductible program, and to establish a cross agency return-to-work program for the state of North Dakota, the 2001 Legislature directed the establishment of a single workers compensation state account. The administration of that program was assigned to the Risk Management Division of the Office of Management and Budget.

Veterans Service Officer

The County Veterans Service Officer (VSO) advises local veterans and their dependents of their rights and entitlements under various federal and state laws. The VSO counsels and actively assists veterans with filling out the numerous and complex forms and paperwork required for obtaining benefits, which include compensation, pension, insurance, death benefits, hospitalization and education.

Township Government

Bottineau County has 44 Townships. Townships have a variety of duties but the main duty is the building and maintaining of township roads. Townships support rural fire protection and rural ambulance services. Among the other duties of townships include animal impoundment, control of noxious weeds, provide aid to a District Fair Association, support an airport, and zoning.

Water Board

The primary responsibility of the Water Board is to provide effective management of Bottineau County's water resources. Bottineau is served by a total of three individual water boards: Bottineau County Resource Water Board, the Oak Creek Water Board, and the Boundary Creek Water Board. The vision is that present and future generations of Bottineau County will enjoy an adequate supply of good quality water for people, agriculture, industry, and fish and wildlife through successful management and development of water resources to ensure health, safety, and prosperity, and balance the needs of generations to come.

Weed Board

North Dakota Law requires every person to do all things necessary and proper to control the spread of noxious weeds. The Noxious Weed Team coordinates the efforts of the County Weed Board to implement integrated weed management programs. The Noxious Weed Team distributes funding through two programs, Target Assistance Grant (TAG) and Landowner Assistance Program (LAP). These funds are available to weed boards and landowners for controlling weeds on the state and county weed lists.

911 Communications

The 911 Communications in Bottineau County is coordinated by the 911 Coordinator. This position keeps the addresses and telephone numbers updated in a database for identification of 911 calls. Bottineau

County uses State Radio as its Public Safety Answering Point as its dispatch center. The dispatch centers receive 9-1-1 calls generated from Bottineau County and can provide lifesaving pre-arrival instructions to the caller until emergency responders have arrived on-scene. Emergency services, which include medical, fire, and law enforcement, are dispatched as dictated by the situation.

2.4.2 Hazard Mitigation Responsibilities of County/City Agencies

In Section 2.4.1 the general duties of county/city officials was described. In this section the hazard mitigation responsibilities are described.

Auditor

Mitigation actions of the Auditor are to assist the County Commission with their responsibilities along with monitoring insurance claims for county property and making recommendations on how property losses may be reduced through mitigation.

City Government

City governments much like the township governments can zone to ensure structures are built in safe places such as outside the flood plain and to proper building codes.

County Commission

The mitigation actions of the County Commission is to provide general guidance to the county officials to develop mitigation strategies emphasizing that mitigation may be short term or long term actions that when carried out will reduce the risk and vulnerability to the county citizens.

Emergency Management

1. Mitigation and risk reduction: (including agency's role, capabilities, and programs that support mitigation actions.)
 - a. Coordinate emergency planning and response activities with numerous county agencies. Planning encompasses preparedness, response, recovery, and mitigation.
 - b. Responsible for everyday operations of the county's Emergency Operations Center.
 - c. Responsible for county wide communications system through the Bottineau County 911 Public Safety Answering Point including radio and telephone systems. (also offer technical and administrative assistance to other county agencies in this area)
 - d. Update and exercise emergency operations and mitigation plans.
 - e. Coordinate state sponsored training for county agencies including law enforcement, public health, social services, fire departments, emergency medical services, etc.
 - f. Coordinate the county's Local Emergency Planning Committee. (meets quarterly)
 - g. Coordinate the county's Tier Two reporting (hazardous materials)
 - h. Conduct public awareness and educational programs via newspapers, radio, and schools to decrease vulnerability to hazards.
 - i. Work with schools and local businesses to help create site specific hazard response plans and present in-service education to local business employees.
 - j. Responsible for timely and effective public information releases during emergency situations.

- k. During a disaster declaration, emergency management has all county resources at their disposal including manpower, communications, and equipment.
 - l. With effective planning, training, and exercising, emergency management can help to mitigate potential hazards within the county.
 - m. Assist in damage assessment and coordinate with state and federal agencies for recovery assistance.
2. Responsibility and authority in the regulating, inspecting, or funding of projects:
- a. In coordination with County Economic Development, assist with applications for federal and state funding such as the Hazard Mitigation Grant Program.
 - b. Involved with inspecting hazardous material storage sites and fulfilling Tier Two reporting requirements.
 - c. Participate in dam inspections with the Army Corp of Engineers.
3. Leadership and coordination with local and non-local government agencies.
- a. Local Agencies: Bottineau County Emergency Management coordinates with appropriate local agencies to ensure preparedness, response, recovery, and mitigation. These agencies include Bottineau County Commissioners, Bottineau County District Health, Bottineau County Road Department, Bottineau County Sheriff’s Department, and various other law enforcement, fire, communication, and emergency medical agencies.
 - b. Non-local Agencies: Bottineau County Emergency Management coordinates with numerous state and federal agencies. These agencies include the North Dakota Department of Emergency Services, North Dakota Highway Patrol, State Health Department, Department of Transportation, and Federal Emergency Management Agency.
4. General recommendations/emergency management concerns:
- a. Provide listings of eligible mitigation projects so counties can be prepared when funds become available.
 - b. Warning systems and sirens are outdated and inadequate. At this time, funding is not available for improvements.
 - c. Bottineau County is constantly striving to improve planning and exercise activities and response capabilities; however, with the county becoming technologically reliant and becoming more industrial, the threat or risk of potential hazards increases, which increases the need for resources, training, and awareness.
 - d. Zoning requirements for flood plain management need to be enforced.

Extension Service

- 1. Mitigation and risk reduction: (including agency’s role, capabilities, and programs that support mitigation actions.)
 - a. The Bottineau County Extension Service is linked in a unique partnership with North Dakota State University to provide practical, research-based information and educational programs to address critical issues facing individuals, families, agricultural producers, business operators, and communities.

- b. County extension agents serve as subject-matter experts, educational planners, adult and youth teachers and community facilitators in several areas including agriculture and natural resources, horticulture, family and consumer sciences, 4-H and youth community development.
 - c. Provide planning, designing, implementing, and evaluating of educational programs for livestock and forage producers.
 - d. Areas of responsibility include beef and dairy cattle, swine, other livestock, water quality, waste management, and forages.
 - e. Provide programming for county citizens in the areas of family financial management, environmental concerns, housing, health and wellness, aging, foods and nutrition, parenting, and human development.
 - f. Serve as an information resource in dealing with drought, winter storms, summer storms etc. in relation to agriculture, environment, water resources, etc.
 - g. Assist with damage assessment related to agriculture.
2. Responsibility and authority in regulating, inspecting, or funding of projects.
- a. Authority is federal level.
3. Leadership and coordination with other government agencies:
- a. Local Agencies: Bottineau County Emergency Management and Bottineau County Public Health.
 - b. Non-local Agencies: North Dakota State University, North Dakota State Health Department, United States Department of Agriculture, and Farm Service Agency.
4. General recommendations/emergency management concerns:
- a. Urban development taking over agricultural lands.

Highway Department

1. Mitigation and risk reduction: (including agency's role, capabilities, and programs that support mitigation actions):
- a. Design bridges, culverts, and overflow sections. The county is working to reduce the total number of bridges by either eliminating them entirely or removing the structures and using a "low water crossing" on lower service roads only. The county highway department follows a very detailed list of design standards for all projects within the county.
 - b. Continually working with the Department of Transportation on various projects since the DOT dispenses federal funding. While the DOT provides technical advice concerning guidelines and standards, they do not provide equipment, materials, or personnel.
2. Responsibility and authority in the regulating, inspecting or funding of projects:
- a. Responsible for and have authority to regulate and inspect all projects completed within the county.
 - b. All projects funded by the state or federal government are designed by a consulting engineer and meet the usual acceptable federal standards. Inspection of federal aid projects is the responsibility of the consulting engineering company and is overseen by the county to

ensure standards are met. Many county projects are designed with in-house expertise and engineers are consulted if problems arise.

- c. All funding in one way or another comes through the county, whether it is a certain percentage of the federal aid project or 100% of the county projects.
3. Leadership and coordination with local and non-local agencies.
 - a. Local Agencies: The County Highway Department has little interaction with other county agencies concerning roads and bridges. They do, however, coordinate with various county agencies concerning right of way and right of way purchasing. The legal aspect of right of way purchasing is overseen by the States Attorney's Office. The land values are usually developed by the Tax Equalization Office and approved by the County Commission.
 - b. Non-local Agencies: The County Highway Department coordinates with various state and federal agencies for technical assistance, permitting, environmental concerns, archeological sites, and cultural issues. These agencies include the North Dakota Department of Transportation, US Fish and Wildlife, Corp of Engineers, and the North Dakota Historical Society.
 4. General recommendations/emergency management concerns:
 - a. Bottineau County Highway Department should assist local government with floodplain management and water development permitting.

Planning and Zoning Board

The mitigation actions of the County Planning and Zoning Board have multiple roles including enforcing the County Zoning Resolution to enforce flood plain ordinances and storm water management regulations. In Bottineau County, there are seven members of the Planning and Zoning Board.

Public Health

1. Mitigation and risk reduction: (including agency's role, capabilities, and programs that support mitigation actions)
 - a. Deal with bona fide health hazards using cause and effect in those areas for both mitigation and risk reduction. If it is a hazard affecting any number of persons and within the scope of public health, Bottineau County Public Health will mitigate or exercise risk reduction through several methods ranging from enforcement of statutes to immunization programs.
 - b. Environmental Health has the knowledge and also access to the State Health Department for mitigation of incidents with hazardous or toxic wastes.
 - c. Programs include waste water treatment, water pollution, public health nursing, immunization programs, solid waste regulation, food establishment inspections, air quality, and vector control.
2. Responsibility and authority in the regulating, inspecting or funding of projects.
 - a. Bottineau County Public Health is a unit of state government that operates through agreements or memorandums of understanding with the North Dakota Department of Health to enforce state public health statutes within the five county districts. Tax levies provide funding. There are no funding programs for non-operational programs.

3. Leadership and coordination with local and non-local government agencies.
 - a. Local Agencies: Within the scope of public health, Bottineau County Public Health coordinates with the following local agencies: Bottineau County Emergency Management, local law enforcement agencies (city and county), local school boards, and planning and zoning agencies.
 - b. Non-local Agencies: Within the scope of public health, Bottineau County Public Health coordinates with the following agencies: North Dakota Department of Health and state and federal law enforcement agencies.

4. General recommendations/emergency management concerns.
 - a. Public Health is normally under-funded and understaffed at all levels of government. Should Bottineau County Public Health be called upon for expertise at a time of emergency or disaster, it normally does not have instrumentation for site level determinations of any kind without support from other agencies.
 - b. Public health agencies should be included in equipment storage; e.g., FEMA equipment "stored" and used at public health agencies, rather than being stored at a warehouse. For example, radio equipment that belongs to FEMA is based at county emergency management offices; the same could be done with air sampling equipment or other instruments/kits etc., which could be used by public health agencies both for daily work and at a time of emergency or disaster.
 - c. Special Note: Bottineau County is a member of the Central Valley Health District. Bottineau County shares its resources, especially in the area of environmental health, with other counties in the region.

Recorder

Mitigation actions of the Recorder are to record the buy-out of flood mitigation projects and easements for the county.

School Districts

The mitigation responsibilities of School Districts include monitoring risk factors for school building maintenance and construction standards to ensure schools are safe for children and staff. The monitoring of roads used as school bus routes in conjunction with the County Highway Department to ensure safe transportation with safe busses and trained school bus drivers are important tasks.

Sheriff's Department

1. Preparedness and risk reduction: (including agency's role, capabilities, and programs that support mitigation actions.)
 - a. Responsible for law enforcement and criminal investigation in unincorporated areas of the county and in smaller towns that do not have police departments.
 - b. Provide standard law enforcement manpower and equipment.
 - c. In disaster situations, provide warning, rescue assistance, evacuation assistance, security, traffic control, and information assistance.
 - d. Provide public awareness and educational programs.

- e. Mutual aid agreements with all surrounding counties and the North Dakota State Highway Patrol.
- 2. Responsibility and authority in the regulating, inspecting, or funding of projects: None
- 3. Leadership and coordination with local and non-local government agencies.
 - a. Local Agencies: Within the scope of law enforcement, the Bottineau County Sheriff's Department coordinates with various local agencies. These agencies include Bottineau County Emergency Management and the Bottineau police department.
 - b. Non-local Agencies: Bottineau County Sheriff's Department coordinates with appropriate state and federal agencies including: North Dakota Highway Patrol, North Dakota Attorney Generals' Office, Bureau of Criminal Investigation, North Dakota State Radio, North Dakota Department of Transportation, Federal Bureau of Investigation, and surrounding county law enforcement agencies.
- 4. General recommendations/emergency management concerns.
 - a. Explore funding resources to upgrade technology such as mobile data terminals, computers, etc.
 - b. Upgrade communication integration among other state and federal agencies (information sharing).

Social Service Director

Through the various social programs available for low income families, the Social Services Director can help ensure the health of the citizenry through proper nutrition and heated homes in the winter months through energy assistance. In addition through the responsibility of child/day care licensing safe day cares can prevail. This position also ensures liaison with public health, faith based organizations, and private relief agencies for disaster victims.

State's Attorney

As the county legal counsel and advisor, the State's Attorney monitors the legality of mitigation actions or advises county officials on the liability facing the county if a mitigation action is not taken.

Tax Equalization Director

The Tax Equalization Director has access to the value of property throughout the county. Their mitigation responsibility is to help determine cost/benefit for mitigation actions. During the disaster recovery phase, the Tax Director determines the value of destroyed property.

Treasurer

The Treasurer is the financial officer for receipt and disbursement of hazard mitigation funds.

Superintendent of Schools

As the Superintendent of Schools the mitigation responsibilities include monitoring risk factors for school building maintenance and construction standards to ensure schools are safe for children and staff. The monitoring of roads

used as school bus routes to ensure safe transportation with safe busses and trained school bus drivers are important tasks.

Risk Manager

The Risk Management Division was established to implement a program to address the State's exposures to tort liability claims and lawsuits due to the loss of sovereign immunity.

Township Government

Through the building and maintaining of township roads township governments can ensure roads are built to proper standards which can withstand floods or other calamities that can damage roads. They can impose load weight limits on roads to protect their integrity. Townships can zone to ensure structures are built in safe places such as out of the flood plain to proper building codes.

Water Board

Through the management of the county water resources the Water Board can establish drains and reservoirs to prevent property damage by flooding, yet conserve water for long term use.

Weed Board

Through the control of county noxious weeds the Weed Board ensures a strong agricultural economy within the county.

Fire Departments

1. Mitigation and risk reduction: (including agency's role, capabilities, and programs that support mitigation actions.)
 - a. Respond to fires in order to protect lives, limit injuries, and minimize damage to property and the environment.
 - b. Respond to accidents in order to provide rescue assistance.
 - c. Assist emergency medical services in providing emergency assistance to sick and injured
 - d. Provide standard firefighting manpower and equipment.
 - e. Respond to spills and releases of hazardous materials with limited tactical involvement. The Department is trained to the Awareness Level; their main role is procuring resources trained to the proper level to respond to the incident. They assist in mitigating the detrimental human and environmental effects of these occurrences.
 - f. Respond to emergencies resulting from natural occurrences such as storms, floods, etc., and assist in mitigating the detrimental results of these occurrences.
 - g. Provide training for department members that enable them to effectively and efficiently carry out their respective duties and responsibilities.
 - h. Develop and provide educational programs that promote the prevention of fires and encourage fire-safe and fire-smart activities.
 - i. Assist in enforcement of city fire ordinances.
 - j. Inspect and certify alarm systems, fire extinguishers, etc. (Bottineau Fire and Rescue)
 - k. Assist with the county's tier two reporting (hazardous materials storage sites)
 - l. In disaster situations, provide assistance in warning, rescue, evacuation, and situation updates.

- m. Devils Lake and Grand Forks Fire Departments provide Homeland Security and Hazardous Materials regional response for Bottineau County and North Eastern North Dakota.
- 2. Responsibility and authority in regulating, inspecting, or funding of projects:
- 3. Leadership and coordination with local and non-local government agencies.
 - a. Local Agencies: In efforts to decrease vulnerability to hazards, the City of Bottineau fire department coordinates with various local agencies. These agencies include Bottineau County Emergency Management, Bottineau County Sheriff’s Department, rural fire departments, Bottineau County Public Works, and various local EMS agencies.
 - b. Non-local Agencies: North Dakota State Fire Marshal and the Federal Emergency Management Agency.
- 4. General recommendations/emergency management concerns.
 - a. City/rural fire departments do not have the training or equipment to safely respond to hazardous material incidents or heavy industrial accidents (such as the Burlington Northern Santa Fe Railroad)
 - b. Explore funding resources for the above concerns.

Other Agency Resources

Mitigation, preparedness, response, and risk reduction.

Awareness Level Fire Department: General fire suppression, rescue, hazardous materials response, public awareness and educational programs. Respond to spills and releases of hazardous materials with limited tactical involvement. For Hazardous Materials response their main role is procuring resources trained to the proper level to respond to the incident.

Ambulance: Emergency response, patient care, transport, and public awareness and continuing education programs.

Utility Company: Provide engineering expertise, heavy equipment, and damage assessment. Also the hardening and burying of power lines. (Utilities)

Electric Cooperative: Provide engineering expertise, heavy equipment, and damage assessment. Also the hardening and burying of power lines (Utilities)

Cable Television: Telephone, Internet, and Cable Television Services.

Telephone Communications: Telephone, Internet, and Cable Television Services.

Telephone Cooperative: Telephone, Internet, and Cable Television Services.

Army Corps of Engineers: Water management within the county. Provide technical expertise, sandbags, and heavy equipment.

Department of Agriculture: Assists with situation and damage assessment; coordination with USDA; hazmat technical assistance; state land use program.

Job Service: Situation assessment and administration of disaster unemployment assistance programs.

North Dakota Forestry Service: Debris removal from recreational facilities; technical assistance; situation and damage assessment.

North Dakota Game and Fish: Technical assistance; debris removal from recreational facilities; facility improvements; situation and damage assessment.

North Dakota Highway Patrol: Enforces laws on public highways and all state property, enforces laws and safety rules and regulations to include hazardous material requirements involving motor carriers, communicate effectively over law enforcement radio channels while initiating and responding to radio communications, perform rescue functions at accidents, emergencies, and disasters to include directing traffic for long periods of time, administering emergency medical aid, and securing and evacuating people from particular areas,

State Fire Marshal: Hazmat route utilization; hazmat technical assistance; situation and damage assessment.

State Radio Communications: Exercise readiness of warning systems and communication support. Serves as the Public Safety Answering Point for Bottineau County.

United States Fish and Wildlife Service: Assist in the development and application of an environmental stewardship ethic for our society, based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility. Guide the conservation, development, and management of fish and wildlife resources.

2.4.3 Emergency Operations Plan

Bottineau County keeps a viable Emergency Operations Plan current through plan revisions, training, and exercises. The Hazard Mitigation Plan is compatible with the Emergency Operations Plan in that those existing authorities, policies, programs, and resources are within the realm of the Hazard Mitigation Plan. The organizational chart of the Emergency Operations Plan is listed below.

**Coordination and Control Relationship Chart
Emergency Management**

Chief Elected Official County Commission City Council								
Emergency Manager, EOC Emergency Operations Staff								
Functional Coordinators								
Coordination and Control Functional Coordinator Chief Elected Official	Damage Assessment Functional Coordinator Tax Equalization	Administration Functional Coordinator Auditor	Public Safety Functional Coordinator Sheriff/Chief of Police	Individual and Family Assistance Functional Coordinator Human Services	Health and Medical Functional Coordinator Health District	Warning Functional Coordinator Chief Elected Official	Communications Functional Coordinator Sheriff	Public Works/Transportation Functional Coordinator Road Super/Engineering
Task Coordinators								
Emergency Manager	Public Works	Treasurer	Law Enforcement	Human Services	District Health Units	Law Enforcement	Communications Center	Engineering
Law Enforcement	Assessor	Assessor	Public Works	ARC	Hospitals	Radio/TV	RACES	Road Department
Auditor	Auditor	State's Attorney	Clerk of Court	VOAD	EMS	PIO	Amateur Radio	Wastewater Facilities
Treasurer	Treasurer		Search and Rescue	Housing	Vector Control	Fire Departments		PSAP
Fire Departments	Law Enforcement	Fire Departments	Auxiliary Groups	Clerk of Court	Pharmacies		Nursing Homes	
Public Works/Engineering	Fire Departments		Bomb Squad	Veteran's Services	Clinics	Nursing Homes		Planning
Assessor	Emergency Management	Fire Departments	HazMat Team	Nursing Homes	Nursing Homes		Planning	
State's Attorney	Emergency Management	HazMat Team				Nursing Homes		Nursing Homes
Tax Equalization		Emergency Management	HazMat Team	Nursing Homes	Nursing Homes		Nursing Homes	

2.5 Risk Assessment Methodologies

A key step in preventing disaster losses in Bottineau County and the incorporated jurisdictions is developing a comprehensive understanding of the hazards that pose risks to the communities. The following terms can be found throughout this plan.

Hazard:	a source of danger
Risk:	possibility of loss or injury
Vulnerability:	open to attack or damage

Source: Federal Emergency Management Agency, 2001.

Risk is the product of probability (likelihood) and consequences of an event. [ii]:

This definition implies that risk can be controlled by managing probability (through mitigation and preparedness) and consequences (through mitigation, preparedness, response and recovery).

[ii]Ansell, J. and F. Wharton. 1992. *Risk: Analysis, Assessment, and Management*. John Wiley & Sons. Chichester. p100.

This all-hazard risk assessment and mitigation strategy serves as an initial source of hazard information for those in Bottineau County. Other plans may be referenced and remain vital hazard documents, but each hazard has its own profile in this plan. As more data becomes available and events occur, the individual hazard profiles and mitigation strategies can be expanded or new hazards added. This risk assessment identifies and describes the hazards that threaten the communities and determines the values at risk from those hazards. The risk assessment is the cornerstone of the mitigation strategy and provides the basis for many of the mitigation goals, objectives, and potential projects.

The *assets and community inventory* section includes elements such as critical facilities, critical infrastructure, population, structures, economic values, ecologic values, historic values, social values, current land uses, new development, and future development potential. Critical facilities and infrastructure were identified, reviewed, and updated as listed in the Bottineau County Local Emergency Operations Plan. Additional elements were included during the plan update based on contractor research. Bottineau County is in the process of implementing the Threat and Hazard Identification and Risk Assessment (THIRA) at the time of the 2015 Hazard Mitigation Plan update.

Each hazard or group of related hazards has its own *hazard profile*. A stand-alone hazard profile allows for the comprehensive analysis of each hazard from many different aspects. Each hazard profile contains a *description* of the hazard containing information from specific hazard experts and a record of the hazard *history* compiled from a wide variety of databases and sources.

Using the local historical occurrence, or more specific documentation if available, a *probability* was determined. In most cases, the number of years recorded was divided by the number of occurrences, resulting in a simple past-determined recurrence interval. If the hazard lacked a definitive historical record,

the probability was assessed qualitatively based on regional history or other contributing factors. The *magnitude* or extent of the hazard describes a realistic approximation of the worst case scenario. This qualitative approximation is based on past occurrences in the county or in nearby counties. If the past occurrence was not an accurate representation, general knowledge of the hazard was used to approximate the types of impacts that could be expected from a low-frequency, high magnitude event of that hazard. Table 2.5A shows the criteria used.

Table 2.5A Local Risk Analysis Criteria

PROBABILITY	
<i>Very Likely</i>	Nearly 100% probability in the next year
<i>Likely</i>	10-100% probability in the next year, or at least 1 chance in the next 10 years
<i>Possible</i>	1-10% probability next year, or at least 1 chance in the next 100 years
<i>Unlikely</i>	Less than 1% probability in the next 100 years
<i>Improbable</i>	Almost a 0% probability of happening in a given year.
MAGNITUDE	
<i>Catastrophic</i>	More than 50% of jurisdiction affected
<i>Significant</i>	25-50% of jurisdiction affected
<i>Moderate</i>	10-25% of jurisdiction affected
<i>Minor</i>	1%-10% of jurisdiction affected
<i>Negligible</i>	<1% of jurisdiction affected

The Bottineau County Risk Assessment for each hazard includes two sections: 1) vulnerability analysis and 2) loss estimate. Where applicable, a combination of historical data, risk data, and exposure data, at the county level, was used to develop an overall vulnerability rating for the county. Where this was possible, a rating of high, moderate-high, moderate, low-moderate, or low was assigned. The ratings are comparative within the hazard, and are not necessarily an indication of the hazard level when compared to other hazards.

Table 2.5B Risk Analysis Classifications (Rating Scale is 1 to 5 – 5 is highest)

		IMPACT				
		<i>Catastrophic</i>	<i>Significant</i>	<i>Moderate</i>	<i>Minor</i>	<i>Negligible</i>
FREQUENCY	<i>Very Likely</i>	5	5	4	3	2
	<i>Likely</i>	5	4	3	2	2
	<i>Possible</i>	4	3	3	2	1
	<i>Unlikely</i>	3	2	2	2	1
	<i>Improbable</i>	2	2	1	1	<1

To assess risks, the planning team studied which hazards have the higher disaster potential, the potential losses of each hazard, vulnerability to county owned facilities and critical infrastructure, and future development.

At the end of the risk assessment, the *summary* brings together data from each of the hazards to show comparisons and ultimately rank the hazards. The prioritization of hazards into high, moderate, and low categories is based on the classification of hazards by the county planning team.

Due to the inherent errors possible in any disaster risk assessment, the results of the risk assessment should only be used for planning purposes and in developing projects to mitigate potential losses.

Mapping of the hazards, where spatial differences exist, allows for hazard analyses by geographic location. Some hazards, such as riverine flooding, can have varying levels of risk based on location (i.e. near the river versus far away from the river). Other hazards, such as winter storms or drought, cover larger geographic areas and the delineation of hazard areas is not typically available or useful on the county scale.

Critical facilities were mapped using data provided by the North Dakota GIS Hub and addresses provided by Emergency Management. The mapping of the facilities allowed for the comparison of building locations to the hazard areas where such hazards are spatially recognized. Base maps depicting the critical facility locations were compared to available hazard layers to show the proximity of the facilities to the hazard areas. Given the nature of critical facilities, the functional losses and costs for alternate arrangements typically extend beyond the structural and contents losses. These types of losses can be inferred based on the use and function of the facility.

Critical infrastructure for services such as electricity, heating fuels, telephone, water, sewer, and transportation systems was assessed in a narrative format using history and a general understanding of such systems to determine what infrastructure losses may occur. Basic mapping exists of the road networks in the county. These layers were additionally compared to the hazard areas. Most of the other types of infrastructure do not have digital mapping or were withheld by the managing company for security reasons.

Population impacts were qualitatively assessed based on the number of structures estimated to be in the hazard area. Factors used in evaluating the population impacts include the ability of people to escape from the incident without casualty and the degree of warning that could be expected for the event. In general, the loss of life and possible injuries are difficult to determine and depend on the time of day, day of the week, extent of the damage, and other hazard specific conditions.

Qualitative methodologies such as comparison to previous disasters, occurrences in nearby communities, and plausible scenarios helped determine the potential losses to *economic, ecologic, historic, and social values*. In many cases, a dollar figure cannot be placed on values, particularly those that cannot be replaced. Therefore, these types of losses were quantified through narrative descriptions and provide some background on what may occur during a disaster.

The assessment on the impact to *future development* is based on the mechanisms currently in place to limit or regulate development in hazardous areas. Some hazards can be mitigated during development, others cannot. The impacts were assessed through a narrative on how future development could be impacted by the hazard based on current regulations.

Many unknown variables limit the ability to quantitatively assess all aspects of a hazard with high accuracy. Therefore, *data limitations* provide a framework for identifying the missing or variable information. These limitations were determined by hazard through the risk assessment process. In some cases, the limitations may be resolved through research or data collection. If a limitation can be reasonably resolved through a mitigation project, the resolution is included as a potential action in the mitigation strategy. *Other factors*

were determined based on an evaluation of past events and a general understanding of the hazard characteristics. This basic listing of secondary hazards provides a link between the hazard profiles and identifies additional risks that may compound the impacts of the primary event (i.e. poor air quality because of smoke during a wildland fire).

At the end of the risk assessment, the *summary* brings together data from each of the hazards to show comparisons and ultimately rank the hazards by jurisdiction. The overall hazard rating is determined using qualitative rankings of the probability of future occurrences and likely impacts when compared to other hazards.

Due to the inherent errors possible in any disaster risk assessment, the results of the risk assessment should only be used for planning purposes and in developing projects to mitigate potential losses.

2.6 Hazard Identification

Hazards are continuously being identified and modified to reflect the needs of the communities. In 2009, the hazards included in the county Multi-Hazard Mitigation Plan were based on those listed in the state’s mitigation plan. In 2015, updates to the hazard list reflected those changes made to the state plan. The jurisdictions were also asked if additional hazards and threats should be considered. To ensure that major hazards were not missed, historic documents and informational databases were reviewed.

New hazards identified include Geologic Hazards and Windstorm. The Summer Storm hazard was renamed to Severe Summer Weather and the scope was broadened to include thunderstorm winds and extreme heat. The Winter Weather hazard was renamed to Severe Winter Weather.

Table 2.6A shows the hazards, jurisdictions, and how and why they were identified. The level of detail for each hazard correlates to the relative risk of each hazard and is limited by the amount of data available. As new hazards are identified, they can be added to the hazard list, profiled, and mitigated.

Table 2.6A Bottineau County Hazards

Hazard Profile	Jurisdiction	How Identified	Why Identified
Communicable Disease (including human, animal, and plant diseases)	All jurisdictions	<ul style="list-style-type: none"> ▪ Centers for Disease Control and Prevention ▪ Bottineau County Public Health ▪ North Dakota Department of Agriculture ▪ North Dakota Department of Health ▪ Pandemic studies ▪ US Department of Agriculture ▪ World Health Organization 	<ul style="list-style-type: none"> ▪ Global disease threat/risk ▪ History of pandemics ▪ Dependence on agricultural economy
Dam Failure		<ul style="list-style-type: none"> ▪ US Army Corps of Engineers ▪ North Dakota State Water 	<ul style="list-style-type: none"> ▪ Several dams throughout the county, including xxx

		Commission	high hazard dams and xxx medium hazard dams
Drought	All jurisdictions	<ul style="list-style-type: none"> ▪ National Drought Mitigation Center ▪ National Climatic Data Center ▪ National Weather Service ▪ North Dakota State Climate Office ▪ US Department of Agriculture 	<ul style="list-style-type: none"> ▪ History of droughts ▪ Importance of agriculture to the local economy ▪ Numerous USDA disaster declarations
Flood (including riverine, <i>levee failure</i> , closed basin, ice jam, and flash floods)	All jurisdictions	<ul style="list-style-type: none"> ▪ Cold Regions Research and Engineering Laboratory ▪ Federal Emergency Management Agency ▪ HAZUS-MH ▪ National Climatic Data Center ▪ National Weather Service ▪ US Army Corps of Engineers 	<ul style="list-style-type: none"> ▪ Extensive history of severe riverine, <i>levee failure</i>, closed basin, ice jam, and flash floods
Hazardous Material Release	All jurisdictions	<ul style="list-style-type: none"> ▪ Federal Motor Carrier Safety Administration ▪ National Response Center ▪ North Dakota Department of Emergency Services ▪ North Dakota Department of Health ▪ US Department of Transportation 	<ul style="list-style-type: none"> ▪ Regular truck and rail traffic transport goods through the county ▪ Facilities containing hazardous materials exist throughout the county
Homeland Security Incident	All jurisdictions	<ul style="list-style-type: none"> ▪ Federal Bureau of Investigation ▪ Memorial for the Prevention of Terrorism ▪ North Dakota Department of Emergency Services ▪ North Dakota State and Local Intelligence Center ▪ Southern Poverty Law Center 	<ul style="list-style-type: none"> ▪ National indications and foreign threats of future terrorist attacks ▪ Potential for school violence and other domestic attacks
Shortage or Outage of Critical Materials or Infrastructure	All jurisdictions	<ul style="list-style-type: none"> ▪ National Oceanic and Atmospheric Administration ▪ North Dakota Department of Emergency Services ▪ Community input 	<ul style="list-style-type: none"> ▪ Dependence on energy resources ▪ History of power, communication, and water outages ▪ History of critical material

			shortages
Severe Summer Storm (including tornadoes, hail, downbursts, thunderstorm winds, lightning, and extreme heat)	All jurisdictions	<ul style="list-style-type: none"> ▪ Federal Emergency Management Agency ▪ National Climatic Data Center ▪ National Weather Service ▪ Storm Prediction Center 	<ul style="list-style-type: none"> ▪ Extensive history of tornadoes, hail, downbursts, thunderstorm winds, lightning, and extreme heat
Transportation Accident (including vehicular, railway, and aircraft accidents)	All jurisdictions	<ul style="list-style-type: none"> ▪ Federal Railroad Administration ▪ National Highway Traffic Safety Administration ▪ National Transportation Safety Board ▪ Upper Great Plain Transportation Institute 	<ul style="list-style-type: none"> ▪ History of small transportation accidents ▪ Potential for larger transportation accidents causing mass casualties
Urban Fire or Structure Collapse	All jurisdictions	<ul style="list-style-type: none"> ▪ City of Bottineau Fire and Rescue Department ▪ City of Kramer Fire Department ▪ National Fire Protection Association ▪ US Fire Administration ▪ North Dakota Fire Marshal 	<ul style="list-style-type: none"> ▪ History of large urban fires ▪ Potential for structure collapses
Wildland/Rural Fire	All jurisdictions	<ul style="list-style-type: none"> ▪ Center for International Disaster Information ▪ North Dakota Forest Service ▪ Farm Service Agency 	<ul style="list-style-type: none"> ▪ Local history of wildland/rural fires ▪ Government lands and Conservation Reserve Program lands within the county
Severe Winter Weather (including blizzards, heavy snow, ice storms, and extreme cold)	All jurisdictions	<ul style="list-style-type: none"> ▪ National Climatic Data Center ▪ National Weather Service ▪ North Dakota Department of Emergency Services 	<ul style="list-style-type: none"> ▪ History of severe winter storms ▪ High probability of blizzards and other potentially damaging storms
Geologic Hazards	All jurisdictions	<ul style="list-style-type: none"> ▪ North Dakota Department of Emergency Services ▪ North Dakota Geological Survey ▪ US Geological Survey 	<ul style="list-style-type: none"> ▪ History of minor geologic events ▪ Potential exists for occasional slumping along rivers
Windstorm	All jurisdictions	<ul style="list-style-type: none"> ▪ Federal Emergency Management Agency ▪ National Climatic Data Center ▪ Storm Prediction Center 	<ul style="list-style-type: none"> ▪ History of severe high wind events ▪ Potential for structure damages or collapse

3. ASSETS AT RISK

In addition to identifying and understanding the hazards of the area, an important aspect of mitigation planning is contemplating the effects such hazards may have on the communities. To thoroughly consider the effects, the assets and values at risk must be first identified. Examples of community assets include the population, critical facilities, businesses, residences, critical infrastructure, natural resources, historic places, and the economy. The following sections identify the specific assets and community inventory.

3.1 Critical Facilities and Infrastructure

Critical facilities and infrastructure protect the safety of the population, the continuity of government, or the values of the community. In many cases, critical facilities fulfill important public safety, emergency response, and/or disaster recovery functions. In other cases, the critical facility may protect a vulnerable population, such as a school, or provide essential goods to rural areas, like a grocery store or gas station.

The North Dakota Critical Infrastructure Program has inventoried specific Critical Infrastructure/Key Resources (CIKR) facilities in the following sectors that may be vulnerable to Homeland Security Incidents:

- Food / Agriculture: major food distribution centers
- Energy: power generation and chemical facilities
- Public Health: hospitals, public health offices, and nursing homes
- Transportation: bridges and major highways
- Emergency Services: police, fire, ambulance, emergency operations center, schools (shelters) and dispatch centers
- Communications: major communications towers and telephone switches
- Water: water and wastewater treatment facilities

One data source that was utilized to analyze critical infrastructure/key resources in Bottineau County was the HSIP Gold Data maintained by the National Geospatial-Intelligence Agency. This data is a compilation of common operational geospatially enabled base-line data to support Homeland Security, Homeland Defense, and National Preparedness – prevention, protection, mitigation, response and recovery. From this data, the following classes of facilities were inventoried and summarized: Energy, Public Health, Transportation, Emergency Services, Communications, and Water. The data identified Bottineau County as having 2,303 Energy, 3 Public Health, 20 Transportation, 31 Emergency Services, and 8 Communications. The source did not list any water treatment facilities as critical infrastructure, but local pumping/lift stations are considered in this plan.

Source: <http://www.nd.gov/des/uploads/resources/915/final-ndmhmp-update.pdf>

North Dakota Fire and Tornado Fund

An additional source of critical facility data was the North Dakota Fire and Tornado Fund. This fund provides insurance to state and local governments and districts. Most facilities and infrastructure owned by county governments and many cities and townships are insured through the North Dakota Fire and Tornado Fund. Therefore, this data source provides a nearly complete assessment of the replacement

values of local government facilities. Certainly all facilities owned by local governments may not be considered critical, but many are.

The types of facilities and infrastructure covered by the North Dakota Fire and Tornado Fund insurance often includes county buildings, city halls, community centers, well and pump houses, communications buildings, towers, and equipment, police stations, emergency operations centers, ambulance buildings, road shops, lift stations, fairgrounds, jails, park facilities, water and wastewater treatment plants, fire stations, museums, warning sirens, municipal airport facilities, and storage buildings. The values insured in Bottineau County include:

- Building Property (Structure) Value: \$20,721,608
- Personal Property (Contents) Value: \$2,258,522
- Outdoor Property Value: \$3,537,540

In addition Bottineau County is the home of the Dakota College in the City of Bottineau. The values of the College are:

- Building Property (Structure) Value: \$23,646,554
- Personal Property (Contents) Value: \$2,934,593
- Outdoor Property Value: \$0

Source: North Dakota State Fire and Tornado Fund, 2013.

Infrastructure can be somewhat more difficult to quantify in terms of replacement costs. Based on data from the North Dakota Office of State Tax Commissioner, taxable valuations show the extent of certain types of infrastructure in the county.

- 2013 taxable valuation of railroad in Bottineau County: \$85,100
- 2013 taxable valuation of pipeline in Bottineau County: \$1,519,186
- 2013 taxable valuation of electric and gas in Bottineau County: \$211,661

Source: North Dakota Office of State Tax Commissioner, 2013.

Based on data provided by the North Dakota State Fire and Tornado Fund in 2013 for the state mitigation plan update, the state-owned buildings and property (not including National Guard or university assets) in Bottineau County have the following values:

- Building Property (Structure) Value: \$3,932,506
- Personal Property (Contents) Value: \$659,053
- Outdoor Property Value: \$237,626
- Source: North Dakota State Fire and Tornado Fund, 2013.

Transportation

Bottineau County has an extensive county and township transportation system linking farms to the city markets and sources of consumer goods. The main county roads and their surface are listed below. These roads are maintained by Bottineau County.

Table 3.1A Bottineau County Roads

Road Name	General Location	Surface
CR 37	N-S from Hwy 5 to CR 6	Pavement
CR 6	E-W from Hwy 14 to Hwy 256	Pavement
CR 27B	N-S from Hwy 5 to CR 20	Pavement
CR 20	E-W from CR 27B to CR 47	Pavement
CR 47	N-S from CR 47 to Hwy 5	Pavement
CR 28A	E-W from Willow City to CR 51	Pavement
CR 51	N-S from CR 28A to Southern County Line	Pavement
CR 30	E-W from US 83 to McHenry County Line	Pavement
CR 17C	N-S from CR 30 to E/W section of Hwy 83	Pavement
CR 2	E-W 2 miles from Canadian Border	Pavement/G
107 th St NW	CR 2 Line to Hwy 83	Gravel
CR 57	N-S through Turtle Mountain Area	Gravel
CR 49	N-S from Hwy 5 to Hwy 43	Pavement
Highway View Road	N-S Traversing Turtle Mountain area	Pavement

Source: Bottineau County, 2014

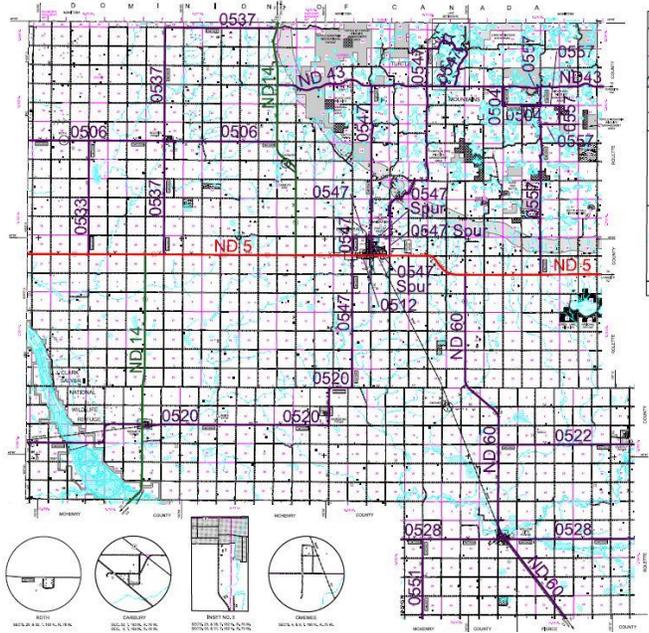
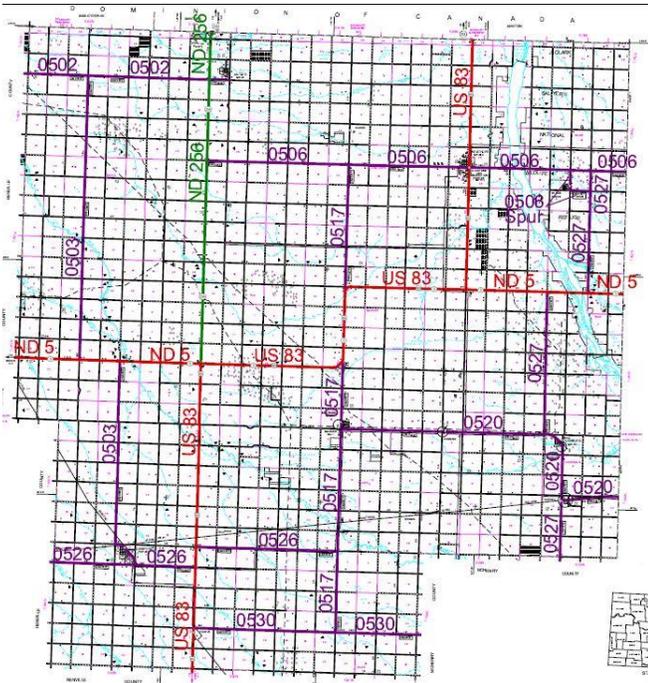
Table 3.1B State and Federal Bottineau County Highways

Highway	Route Direction
US 83	North-South across the Western Part of the County
ND 5	East-West through middle of County
ND 14	North-South from Salyer Refuge to ND Hwy 5, follows 5 east/west before heading North to Canadian Border
ND 43	East-West through the Turtle Mountains /Lake Metigoshie from Hwy 14 in NE portion of County
ND 60	North-South in Southeastern portion of county
ND 256	North from Hwy 83 to Canadian Border

Source: North Dakota Department of Transportation, 2014

The transportation system is outlined in the following figure.

Figure 3.1C Bottineau County Roads



Source: NDDOT, 2015

The only US route through Bottineau County is US Highway 83, which is the longest North-South Highway in the United States. It runs from Westhope, North Dakota to Brownsville Texas on the Mexican border and is 1,894 miles long. Despite its length, Highway 83 has very few intersections with interstates, maintaining its ‘commissioned’ status through its nearly 1900 mile route.

North Dakota Highway 5 dissects the middle of Bottineau and is the main East-West arterial route through the county. Highway 5 is a two lane road that begins in Joliette, ND (east) and ends in Fortuna, ND (west). It is 337 miles long and is never farther than 17 miles south of the Canadian border. The Highway transitions to Montana Highway 5 (west) and Minnesota Highway 175 (east).



Route information	
Length:	1,894 mi ^[1] (3,048 km)
Existed:	1926 ^[1] – present

Table 3.1D Bottineau County Annual Daily Traffic Counts

Highway	Total Traffic Count	Commercial Traffic Count
U.S. 83/Hwy 5 in Western Bottineau County	1190	300
U.S 83 at Canadian Border	225	30
ND 5 on Western County Line	1570	395
ND 256 at Canadian Border	280	65
ND 14 at Canadian Border	140	20
ND 14 at Southern County Border	470	55
ND 60 at Southern County Border	375	65
ND 5 on Eastern County Line	1705	150
ND 43 near Lake Metigoshe	895	70

Source: North Dakota Department of Transportation, 2014

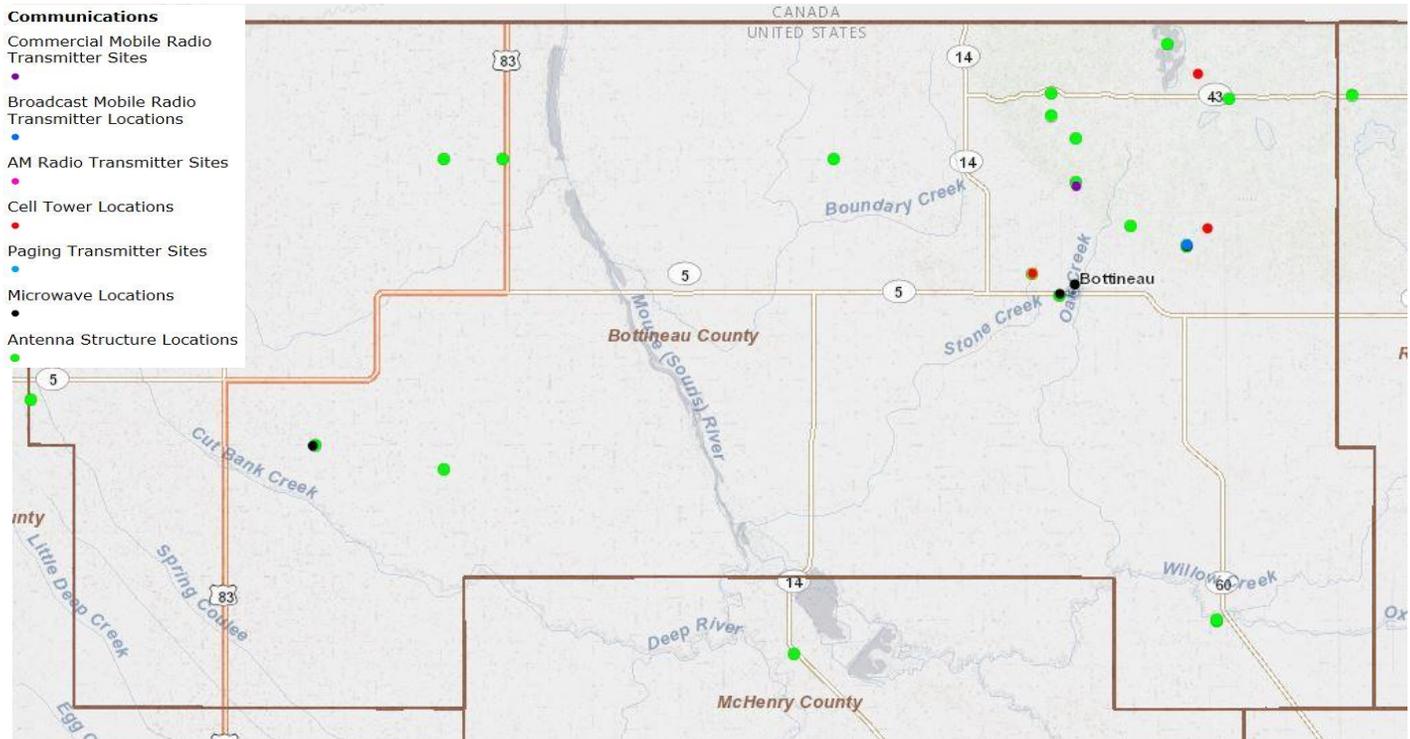
Gravel is the main surface coating for county roads. This causes problems during the spring at snow-melt and when the frost comes out of the ground and during periods of heavy rainfall. Under those conditions road surfaces become muddy and soft creating dangerous road conditions. Gravel roads are also more prone to washouts as excess water may exceed culvert capacity as it moves from one pothole/lake to another during high water periods. Gravel roads are also subject to traffic impacts. As farms have become larger, farm trucks have become larger. Small grain, bean, canola, sunflower, and corn harvest times can cause severe road damage as heavy farm trucks move the harvested crops to storage or markets.

Communication Towers

The figure below shows the communication towers located in Bottineau County. The cell towers are displayed along with microwave towers and antenna towers. The antenna towers are the county communications towers used for county communications. Emergency responder agencies use these towers including law enforcement, fire departments, and emergency medical services. These towers are also used by county road crews which are very important in that as they are out blading and maintaining county roads they serve as severe summer weather spotters and can get information quickly to other county resources in the event of a tornado or other severe weather event. County road crews also remove snow from the roadways under dangerous conditions of extreme wind chills and poor visibility. If an accident should happen the radio system is used to call for assistance. School busses also use the county radio system which is critical for the safety of children being transported to and from school especially in

winter months when extreme cold or hampered visibility conditions exist. If a school bus breaks down or becomes stuck in a blocked road or goes off the road the county radio system is used to call for assistance.

Figure 3.1E Bottineau County Communication Towers



Source: ND GIS Hub, 2015

Heating Sources

During the cold winter months, the heating of homes and businesses is a necessity. Residents of Bottineau County use a variety of fuels; however, it is important to note that most systems ultimately require electricity to run their thermostats and blowers. The following statistics shows the number of housing units for 2009-2013 in Bottineau County by home heating fuel type:

- Utility gas: 56
- Bottled, tank, or LP gas: 916
- Electricity: 1,658
- Fuel oil, kerosene, etc.: 332
- Coal or coke: 25 (**Coke** is a fuel with few impurities and a high carbon content, usually made from coal.)
- Wood: 9
- Solar energy: 0
- Other fuel: 25
- No fuel: 7

Source: US Census Bureau, 2009-2013 American Community Survey

Each jurisdiction identified its own critical facilities and infrastructure as part of the Local Emergency Operations Plan development. Those facilities are listed here by jurisdiction.

Table 3.1F Critical Facilities

LEVEL I CRITICAL FACILITIES	LOCATION	CITY
ST. ANDREWS HEALTH CENTER	316 OHMER STREET	BOTTINEAU
FIRE DEPARTMENT	115 6TH STREET WEST	BOTTINEAU
FIRE DEPARTMENT	2ND AVENUE AND MAIN STREET	MAXBASS
FIRE DEPARTMENT		LAKE METIGOSHE
FIRE DEPARTMENT	16 2 ND AVENUE	KRAMER
FIRE DEPARTMENT		WILLOW CITY
FIRE DEPARTMENT		ANTLER
FIRE DEPARTMENT		LANSFORD
FIRE & RESCUE		WESTHOPE
AMBULANCE		WESTHOPE
SHERIFF'S OFFICE/COURTHOUSE	314 5 TH STREET WEST	BOTTINEAU
FIRE DEPARTMENT		SOURIS
FIRE DEPARTMENT		NEWBURG
AMBULANCE (LANSFORD/SHERWOOD)		MOHALL

LEVEL II CRITICAL FACILITIES	LOCATION	CITY
DAKOTA COLLEGE	105 SIMRALL BLVD	BOTTINEAU
WALMART SUPERCENTER	912 11 TH STREET EAST	BOTTINEAU

Table 3.1G Critical Infrastructure

CRITICAL INFRASTRUCTURE	LOCATION	CITY
Municipal Airports (1)	9770 13 TH AVENUE NE	BOTTINEAU
Communications Towers	SEE FIGURE 3.1E	COUNTY WIDE
Transportation facilities including railroad, highways, airport, pipeline	SEE FIGURE 3.1C	COUNTY WIDE
Bridges (1 Scour)	NA	NA
<i>*Note* No High/Medium Hazard Dams in Bottineau County</i>	DAM FAILURE RATING: D	COUNTY WIDE

Table 3.1.H Vulnerable Populations (Schools, Day Care Facilities, non-english speaking housing, hotels, low income, and Nursing Homes)

VULNERABLE POPULATION	ADDRESS	CITY
GOOD SAMARITAN SOCIETY	725 EAST 10 TH STREET	BOTTINEAU
ST ANDREWS HEALTH CENTER	316 OHMER STREET	BOTTINEAU
DAKOTA COLLEGE	105 SIMRALL BLVD	BOTTINEAU
BOTTINEAU HIGH SCHOOL	301 BRANDER STREET	BOTTINEAU
COBBLESTONE INN	1109 11 TH STREET EAST	BOTTINEAU
SUPER 8	1007 11 TH STREET EAST	BOTTINEAU

VULNERABLE POPULATION	ADDRESS	CITY
NORWAY HOUSE MOTEL	815 11 TH STREET EAST	BOTTINEAU
TURTLE MOUNTAIN INN	345 11 TH STREET WEST	BOTTINEAU
BOTTINEAU ELEMENTARY SCHOOL	700 MAIN STREET	BOTTINEAU
WESTHOPE HIGH SCHOOL	395 MAIN STREET	WESTHOPE
NEWBURG UNITED SCHOOL DISTRICT	400 LIBBIE STREET	NEWBURG
CAMP METIGOSHE	10605 LAKE LOOP ROAD E	BOTTINEAU
LITTLE WONDERS DAY-CARE	619 MAIN STREET	BOTTINEAU
TWIN OAKS RESORT	10723 LAKE LOOP ROAD WEST	BOTTINEAU
FOUR SEASONS RESORT	10700 LAKE LOOP ROAD EAST	BOTTINEAU

Special Population Districts

Bottineau County is unique in the fact that it has a unique terrain to North Dakota in the form of a range of hills (Turtle Mountains) which are dotted with lakes and tree covered, making this area a popular destination for vacationers and temporary visitors. These populations are particularly vulnerable to hazards due to their lack of rural knowledge and emergency procedures, along with some that pull campers and other various forms of housing that are not ‘permanent’ structures. The list of these locations with their number of residences can be found below.

- Lake Metigoshe – 922**
- Lake McArthur – 11**
- Long Lake – 11**
- Boundry Lake – 18**
- Loon Lake -- 12**

We can assume that normally these cabins will have a minimum of 2-3 people, multiplied over 974 cabins, there is a strong likelihood that this special population district in northeast Bottineau County will have on peak summer weekends, between 2,000 and 3,000 additional people may be residing in Bottineau County, which is approximately half of the current population.

Rural Water

Bottineau County has an abundance of ground water supplied by aquifers deposited by glacial actions. However this water often contains minerals making it not preferred for household use. It is adequate for irrigation and livestock and other agricultural and industrial uses. To get good water to rural homes, the water is supplied by the All Seasons Water Users District headquartered in Bottineau which serves the majority of the county. The Turtle Mountain Water District out of Belcourt serves the extreme Northeast section of the county, while the Upper Souris Water District out of Kenmare serves the Lansford corner of the county.

Source: http://www.ndrw.org/image/cache/MRI_11x17_map_Feb_2013.pdf

Aviation Facilities

There are eight airports in Bottineau County, two public and six are private.

Peterson Airstrip Airport - 4NA3 Antler, North Dakota Facility Usage: Private	Darwin Peterson 2730 100th St Nw Antler, ND 58711 (701) 756-6931
Bottineau Municipal Airport - D09 Bottineau, North Dakota Facility Usage: Public	Bottineau Airport Authority 617 E 5th St Bottineau, ND 58318 (701) 228-3703
Undlin Airstrip Airport - 7NA2 Lansford, North Dakota Facility Usage: Private	Curtis Undlin 8741 29th Ave Nw Lansford, ND 58570 (701) 784-5888
Tengesdal Airport - 69ND Maxbass, North Dakota Facility Usage: Private	Spruce-N-Wheat Acres Llc 9169 15 Ave Nw Maxbass, ND 58760 (701) 268-3172
Johnson Airport - 2ND7 Newburg, North Dakota Facility Usage: Private	Richard Johnson 289 94th St Nw Souris, ND 58783 (701) 359-4471
Kornkven Airstrip Airport - NA07 Souris, North Dakota Facility Usage: Private	Owen Kornkven Souris, ND 58783 (701) 243-6392
Sjule Pvt Airstrip Airport - 7NA9 Souris, North Dakota Facility Usage: Private	Thomas R. Sjule Rt 2, Box 54 Souris, ND 58783 (701) 228-3444
Westhope Municipal Airport - D64 Westhope, North Dakota Facility Usage: Public	Westhope Airport Authority P.O. Box 451 Westhope, ND 58793 (701) 245-6215

Source: <http://www.tollfreeairline.com/northdakota/bottineau.htm>

3.2 Population and Structures

The citizens, visitors, and their property are at all risk from various disasters. In essentially all incidents, the top priority is the protection of life and property. Table 3.2A shows the population by jurisdiction based on the estimated July 1, 2013 population provided by the US Census Bureau.

Table 3.2A Population Statistics

Location	Population	Change Since 2010 Census
Bottineau County (TOTAL)	6,736 (July 1, 2013)	+ 4.8%
City of Antler	27 (2010)	NA
City of Bottineau	2,341 (2013)	+ 5.9%
City of Gardena	29 (2010)	NA
City of Kramer	29 (2010)	NA
City of Landa	38 (2010)	NA
City of Lansford	245 (2010)	NA
City of Maxbass	84 (2010)	NA
City of Newburg	110 (2010)	NA
City of Overly	18 (2010)	NA
City of Souris	58 (2010)	NA
City of Westhope	427 (2013)	- 0.5%
City of Willow City	170 (2013)	+ 4.3%

Source: US Census Bureau, 2010 and 2013

Like critical and special needs facilities, structures such as residences and businesses are also vulnerable to hazards. Based on US Census data, the following data applies to Bottineau County:

- Housing units: 4,333
- Median value of owner-occupied housing units (2013): \$84,200
- Median year the housing units were built: 1975
- Persons per household (2013): 2.06
- Private nonfarm establishments (2012): 270
- Building permits (2014): 22 (Direct from County Assessor)

US Census Bureau, 2008-2012 American Community Survey, <http://quickfacts.census.gov/qfd/states/38/38009.html>

The value of structures in the county can be based on tax assessment data:

- 2013 taxable valuation of residential property in Bottineau County: \$19,085,139
- 2013 taxable valuation of commercial property in Bottineau County: \$4,648,502
- 2013 taxable valuation of agricultural land in Bottineau County: \$23,916,585

Source: ND Tax Department

3.3 Economic, Ecologic, Historic, and Social Values

The economy of Bottineau County and the jurisdictions is driven by retail trade, wholesale trade, manufacturing, agriculture, and accommodation and food services. Disasters of any magnitude can threaten the fragile economies and well-being of residents. Some basic economic statistics follow:

- Median household income: \$51,667
- Persons below poverty: 11.0%
- Total number of firms (2002): 858

Source: US Census Bureau, 2008-2012 American Community Survey, <http://quickfacts.census.gov/qfd/states/38/38009.html>

The sales, shipments, receipts, or revenue in 2007 for Bottineau County by industry are as follows:

- Retail trade: \$56,982,000
- Wholesale trade: \$135,017,000
- Manufacturing: \$4,621,000
- Health care and social assistance: \$13,108,000
- Accommodation and food services: \$6,913,000

Sources: US Census Bureau, 2007,

(http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_00A1&prodType=table)
& https://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi_apBottineaucounty.pdf

Based on data from the US Census of Agriculture in 2012, Bottineau County had:

- Number of farms: 863 farms
- Acres in farmland: 899,431 acres
- Total market value of agricultural products sold: \$254,032,000
- Market value of crops sold: \$241,696,000
- Market value of livestock, poultry, and their products sold: \$12,336,000
- Primary crops (based on acreage): Barley, Sunflowers, Soybeans, Forage, Wheat, and Oats.

Source: US Department of Agriculture, 2012

(http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/North_Dakota/st38_2_001_001.pdf)

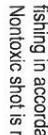
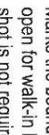
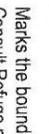
The ecologic, historic, and social values of Bottineau County and the jurisdictions each tie in to the quality of life for residents and visitors. Without these values, lives and property may not be threatened, but the way of life and connections to history and the environment could be disrupted. These values can have deep emotional meaning and investment.

Ecologic values represent the relationship between organisms and their environment. For humans, these values include clean air, clean water, a sustainable way of life, and a healthy, natural environment including a diversity of species. Natural hazards, such as floods and wildfires, are usually part of a healthy ecosystem but often human caused hazards damage ecologic values. Ecologic values in Bottineau County include the Souris River and the Souris River Valley, the drift prairie with its gentle rolling hills and potholes and small lakes that serve as waterfowl nesting and resting areas during the fall and spring migrations. Much of the Souris River Valley is wooded with mixed hardwood stands, timbered hills, and lush river bottoms, thus containing an abundance of plant and animal life. There are many acres of native prairie grasses and wild flowers such as the Prairie Lily that have never been tilled and turned into cropland on the hilly glacial features that occur in the county. The most prominent Glacial Lake in this region is the popular 1,551 acre Lake Metigoshe State Park; which is 14 miles Northeast of Bottineau and was opened in 1937 under the WPA. Listed endangered species in Bottineau County include the Whooping Crane and a candidate species are the Sprague's Pipit and the Northern Long Eared Bat. On November 23, 2014, two species of North Dakota prairie butterflies gained protection under the Endangered Species Act. They are the Dakota Skipper and the Poweshiek (US Fish and Wildlife Service, 2014). Bottineau County has numerous lands that are designated for wildlife production but yet are open to public hunting. Bottineau County is home to the J. Clark Salyer National Wildlife Refuge which runs from the Canadian border, through the middle of the county and continues into McHenry County. Salyer is the largest refuge in the State of North Dakota. Other

county habitats are listed the maps below which were taken from the North Dakota Game and Fish PLOTS Conservation Guide (2014).

Figure 3.4A, Wildlife Conservation Areas

Map Features

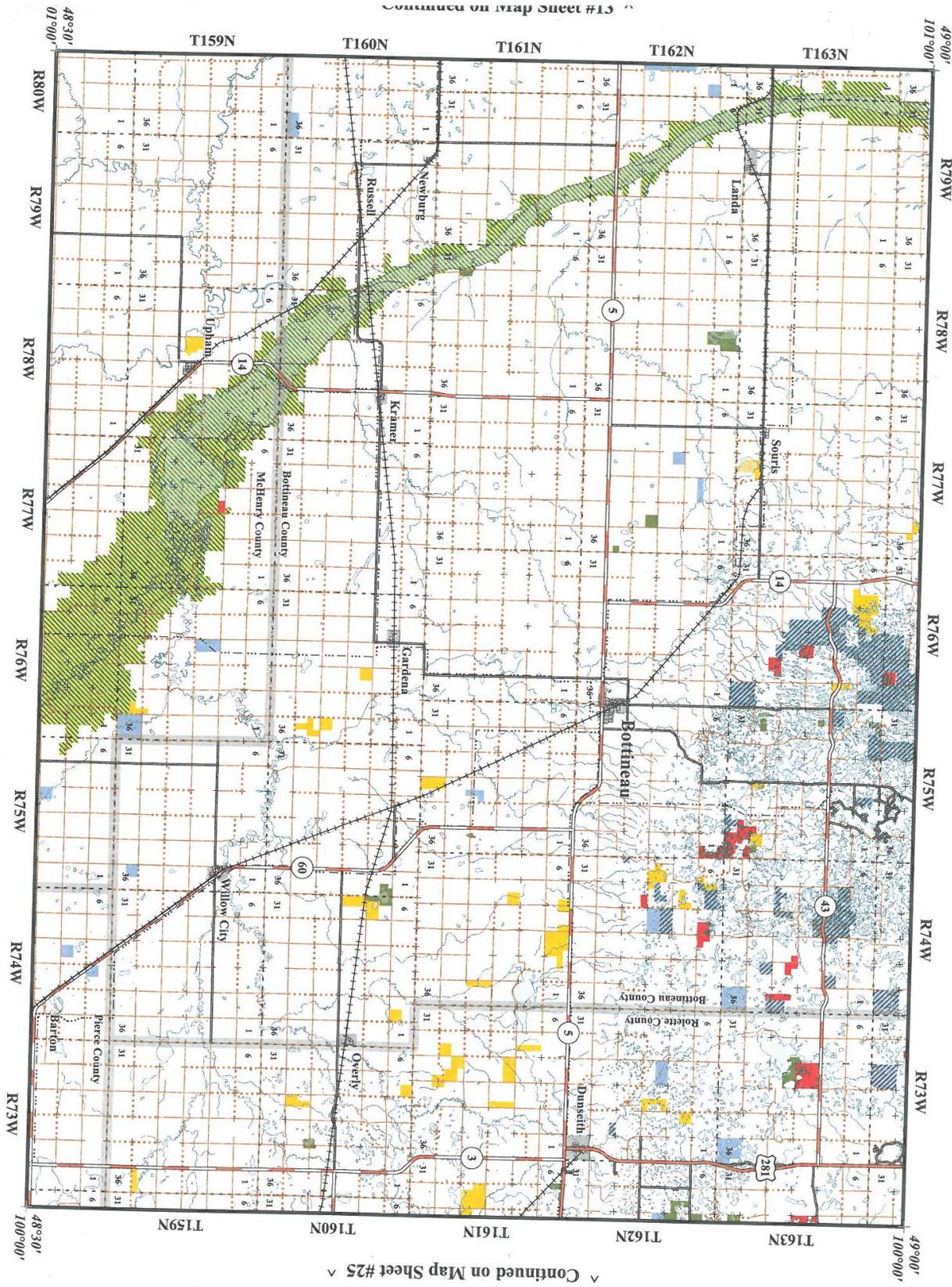
	Interstate		ND Game & Fish PLOTS Locations		ND State Land Department		Bureau of Reclamation
	Federal		ND Game & Fish Wildlife Management Areas (WMA)		ND State Forest Service		US Army Corps of Engineers
	State		ND Department of Agriculture State Waterbank		US Fish & Wildlife Service Waterfowl Production Area (WPA)		Bureau of Land Management
	Paved Road		US Fish & Wildlife Service National Wildlife Refuge (NWR)		US Forest Service		
	Gravel or Graded & Maintained		Ducks Unlimited				
	Unimproved Roads & Trails		Waterfowl Rest Areas				
	City Streets & Subdivisions						
	Township Boundary						
	County Boundary						
	Utility Lines						
	Section Corners						
	Water Body						
	River or Stream						

The North Dakota Game and Fish Department compiled these maps according to conventional cartographic standards, using the most reliable information available. The Department does not guarantee freedom from errors or inaccuracies and disclaims any legal responsibility or liability for interpretations made from these maps, or decisions based thereon. The colors of land features may look slightly different when covered by water.

Map Sheet 19

Scale 1:325,000
1 inch represents 5.13 miles

NDGF-GIS-41-48100-BH



Continued on Map Sheet #15

Continued on Map Sheet #25

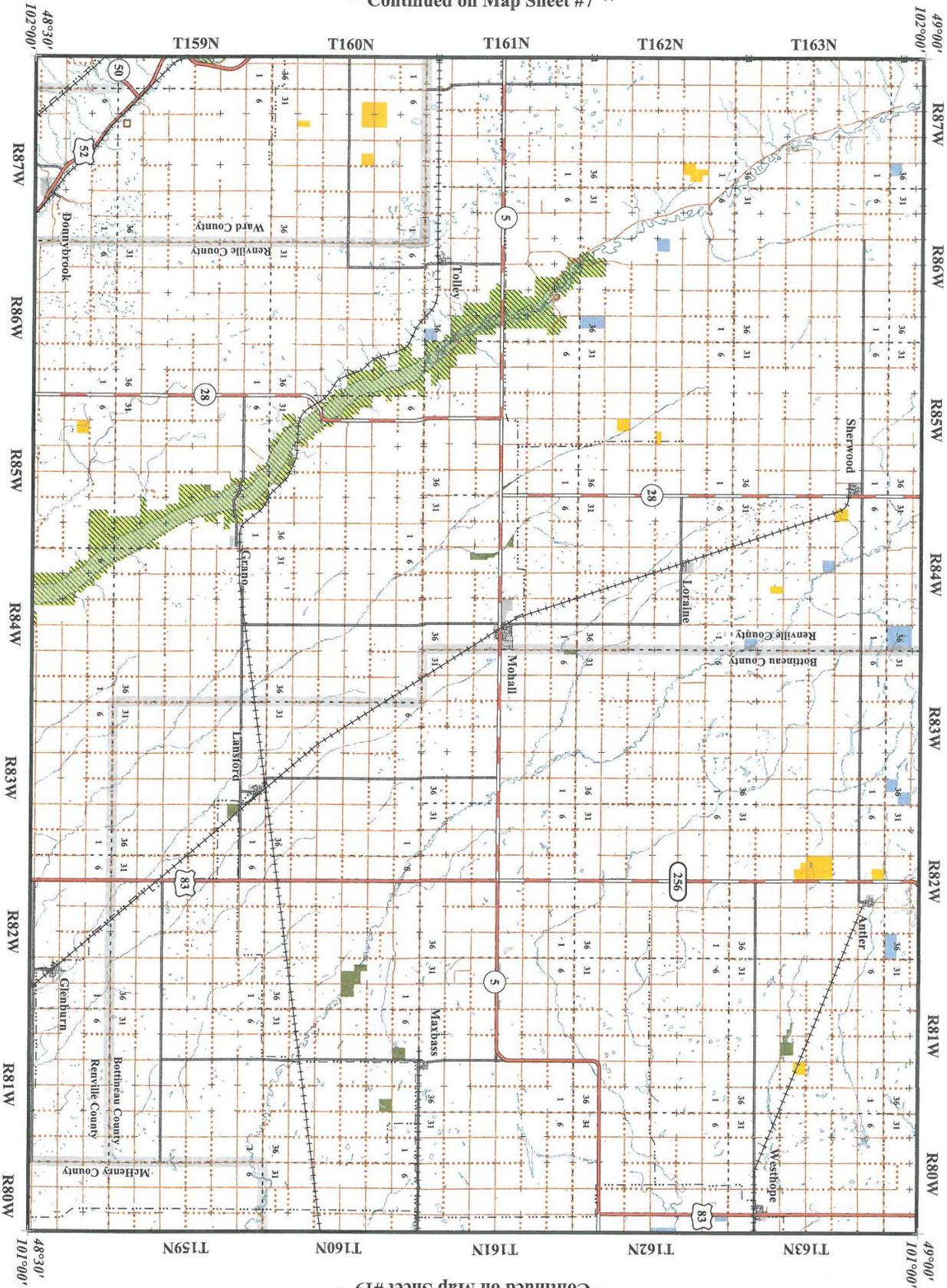
Map Sheet 13

Scale 1:325,000
1 inch represents 5.13 miles

NDGF-GIS-el_48101-BH

^ Continued on Map Sheet #7 ^

^ Continued on Map Sheet #19 ^



Historic values capture a piece of history and maintain a point in time. Historic values can include sites, buildings, documents, and other pieces that preserve times past and have value to people. Bottineau County has 4 sites listed in the National Register of Historic Places. The historic sites include the Ole Crogen Farm District 4 miles NW of Bottineau, the Old Main on Dakota College's campus in Bottineau, the State Bank of Antler in Antler, and the Swedish Zion Lutheran Church in Souris. Source: (National Park Service, 2015)

Social values are difficult to quantify but are an important aspect of quality of life and interpersonal relationships. Examples of social values in Bottineau County and the jurisdictions may include gatherings promote community building, personal achievement, freedom from tyranny, the ability to communicate with others, pride in making the world a better place, and friendships. The realm of social values is only limited by the human imagination and usually relates to how a person feels. Disasters, both natural and human caused, can disrupt important social activities and sometimes have lasting effects on society.

A Social Vulnerability Index compiled by the Hazards and Vulnerability Research Institute in the Department of Geography at the University of South Carolina measures the social vulnerability of U.S. counties to environmental hazards for the purpose of examining the differences in social vulnerability among counties. Based on national data sources, primarily the 2010 census, it synthesizes 42 socioeconomic and built environment variables that research literature suggests contribute to reduction in a community's ability to prepare for, respond to and recover from hazards (i.e., social vulnerability).

Eleven composite factors were identified that differentiate counties according to their relative level of social vulnerability: personal wealth, age, density of the built environment, single-sector economic dependence, housing stock and tenancy, race (African American and Asian), ethnicity (Hispanic and Native American), occupation and infrastructure dependence.

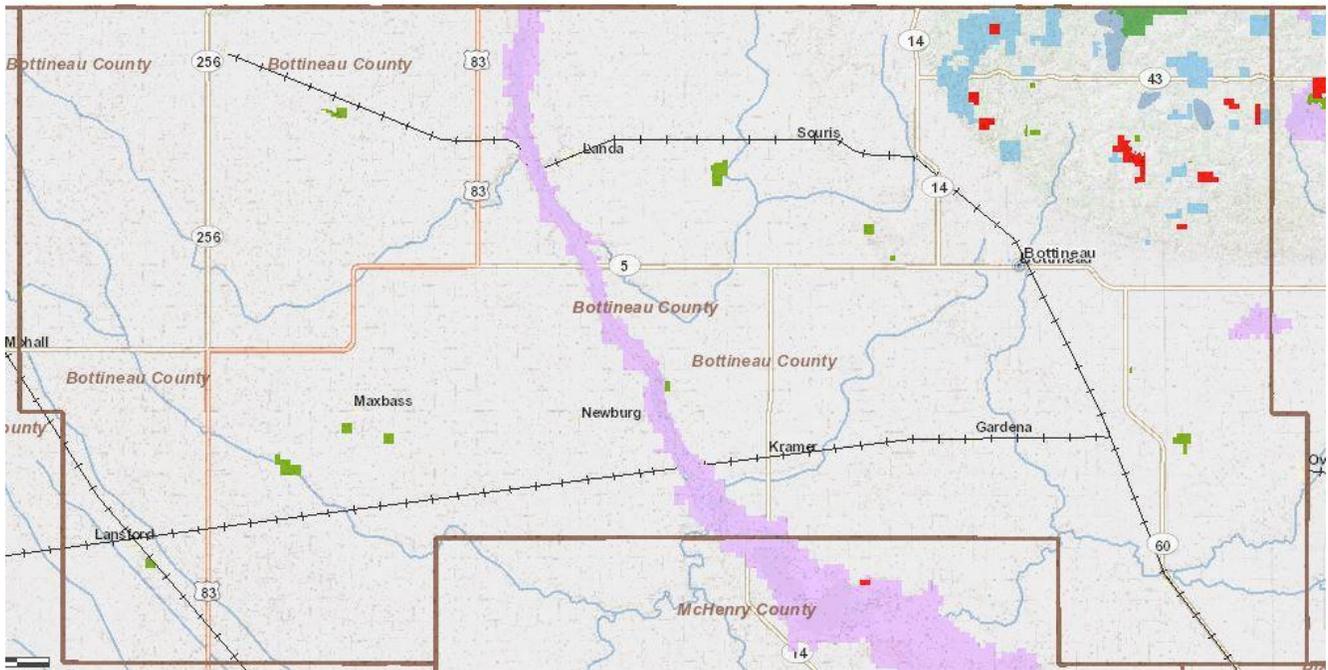
At the time of the 2014 revision, the Social Vulnerability Index 2006-2010 is the most recent data. The index can be used by the county to help determine where social vulnerability and exposure to hazards overlaps and how and where mitigation resources might best be used. Bottineau County has a High Social Vulnerability to Environmental Hazards ranking along with 15 other Counties. 17 Counties were classified under a Medium-High Vulnerability, 11 Counties as Medium, 6 Counties as Medium-Low, and three counties with a low Social Vulnerability to Environmental Hazards.

http://webra.cas.sc.edu/hvri/products/sovi2009_img/PNG/NorthDakota.png

3.4 Current Land Use

Bottineau County land is generally devoted to agriculture. Small communities and individual homes and farms are interspersed throughout the county. Cropland dominates the Bottineau County agricultural lands, however in the Turtle Mountains much of the land is devoted to forest land, recreation, pasture land and hay land. Infrastructure such as railways, roads, and highways traverse the county. Figures 3.4A and 3.4B show the current land use, most of the land use is devoted to agriculture.

Figure 3.4A State and Federal Managed Lands



Source: ND GIS Hub, 2015

State Lands

State Forest



State Parks



Wildlife Management Areas



Federal Lands

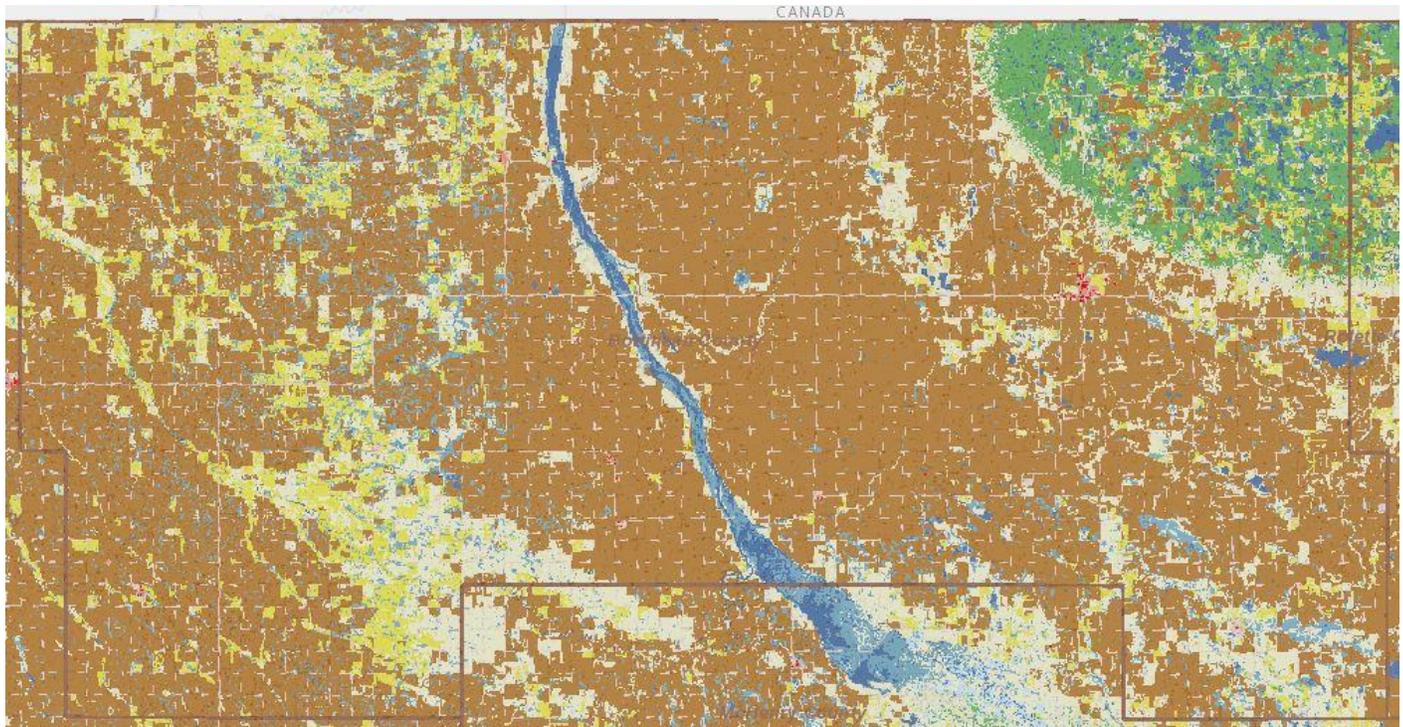
National Wildlife Refuges



Waterfowl Production Areas



Figure 3.4B Land Cover



Source: ND GIS Hub, 2015

Land Use/Land Cover

NDHUB.LANDCLASS_NLC_2011

-  Open Water
-  Developed, Open Space
-  Developed, Low Intensity
-  Developed, Medium Intensity
-  Developed, High Intensity
-  Barren Land
-  Deciduous Forest
-  Evergreen Forest
-  Mixed Forest
-  Shrub/Scrub
-  Herbaceous
-  Hay/Pasture
-  Cultivated Crops
-  Woody Wetlands
-  Emergent Herbaceous Wetlands

3.5 New Development

Bottineau County can be described as a boom county. After it was officially organized in 1884, the population boomed from less than 1,000 to 17,295 by 1910. The population has fallen by an average of 100 people per year since 1910. By the 2010 census, the population was pegged at 6,429, less than half of the population 100 years before. Due to the recent oilfield developments and other factors, the population has finally begun to rebound; its 2013 estimate from the US Census Bureau put Bottineau County at 6,736 residents, up nearly 5% in just three years. The mix of farming, business, hunting, and tourist industries makes Bottineau County a prime location for people with a wide array of interests. The Turtle Mountains in the Northeast portion of the state have numerous resorts complete with streams, woods, and lakes for travelers and residents to enjoy making it (particularly Lake Metigoshe) one of the top tourist destinations in all of North Dakota. Dakota College in Bottineau which focuses on forestry and wildlife majors is also an attractive destination for the younger generation as the college is the only one in the state with such a strong focus in those areas. These sentiments are reflected in the increasing population and construction being done in the county.

Job Service North Dakota estimates the number of residential building permits, units, and construction costs by county. Bottineau County added 17 housing units in 2013.

https://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi_apBottineaucounty.pdf

Table 3.5A shows the estimated development in the county since 2008. Note that only areas with building permit systems are included. Additional new construction may be occurring in areas lacking building permit regulations.

Table 3.5A New Privately-Owned Residential Building Permit Data

Year	Residential Building Permits	Construction Costs
2008	2	\$350,000
2009	2	\$500,000
2010	2	\$225,000
2011	5	\$1,235,000
2012	9	\$1,410,000
2013	11	\$2,080,000
TOTAL	31	\$5,800,000

Source: https://www.ndworkforceintelligence.com/admin/gsipub/htmlarea/uploads/lmi_apBottineaucounty.pdf

3.6 Future Development

The population growth and development trends in Bottineau County are related to a strong birth rate, some out-migration, centralization to urban centers, and commuters moving to rural areas. Bottineau County is an oil producing county, located on the eastern edge of the Spearfish Formation. In 2014 it

appeared that fracking would be prevalent in Bottineau County but with the recent drop in oil prices the future of further oil exploration in Bottineau County is up in the air. Large introductions of new industries are not anticipated in the near future.

Existing land uses and the review processes and regulations for new development play important roles in disaster mitigation. Often, smart development is an inexpensive and effective way to reduce the impact of future disasters on the community. The following mechanisms are used by the jurisdictions to guide future development.

Building/Zoning Codes:

North Dakota has a voluntary building code program. Effective January 1, 2011, the North Dakota State Building Code consists of the 2009 International Building Code, International Residential Code, International Mechanical Code, and International Fuel Gas Code, along with state amendments. Jurisdictions are permitted to further amend the State Building Code to conform to local needs. Communities can join by adopting and enforcing the state building code.

In Bottineau County, each county is tasked with deciding their own building codes and enforcing them at their own discretion and some townships have no building codes.

4. RISK ASSESSMENT / HAZARD PROFILES

4.1 Communicable Disease

Including Human, Animal, and Plant Diseases

Frequency	Likely	1-10% probability next year, or at least 1 chance in the next 100 years
Impact	Moderate	25-50% of jurisdiction affected
Risk Class	3	Moderate National Advisory system in place from the Center for Disease Control, State Advisory from ND Department of Health
Seasonal Pattern	Variant	
Duration	Weeks/Months	
Speed of Onset	Unpredictable and dependent on specific event	

4.1.1 Description

Diseases affect humans, animals, and plants continuously. Each species has its own natural immune system to ward off most diseases. The causes and significance of diseases vary. Of significance in the disaster prevention realm are communicable diseases with the potential for high infection rates in humans or those which might necessitate the destruction of livestock or crops. Such diseases can devastate human populations and the economy.

Disease transmission may occur naturally or intentionally, as in the case of bioterrorism, and infect populations rapidly with little notice. New diseases regularly emerge or mutate. Known diseases, such as influenza, can be particularly severe in any given season. Terrorism experts also theorize the possibility of attacks using biological agents.

Human Disease

Human epidemics may lead to quarantines, large-scale medical needs, and mass fatalities. Typically, the elderly, young children, and those with suppressed immune systems are at greatest risk from communicable diseases. The following biologic agents are considered the highest bioterrorism threats (Category A) due to their ease of dissemination or person-to-person transmission, high mortality rate with potential for major public health impacts, potential for public panic and social disruption, and the necessity for special public health preparedness:

- Anthrax
- Botulism
- Plague
- Smallpox
- Tularemia
- Viral Hemorrhagic Fevers

(Centers for Disease Control and Prevention, 2015)

In addition to global disease and bioterrorism concerns, naturally occurring diseases can threaten communities. Natural illnesses of particular concern, among others, include:

- Food-borne illnesses, such as E. coli and Salmonella
- Influenza
- Meningitis
- Pertussis/Whooping Cough
- Measles
- Enterovirus D68 (EV-D68)*
- Norwalk Virus
- Severe Acute Respiratory Syndrome (SARS)
- Ebola (shortage of PPE* due to JIT* Manufacturing)
- H1N1
- Hantavirus

**PPE-Personal Protective Equipment, JIT-Just in Time, EV-Enterovirus*

These diseases can infect populations rapidly, particularly through groups of people in close proximity such as schools, assisted living facilities, and workplaces.

Enterovirus D68 (EV-D68) is one of more than 100 non-polio enteroviruses. This virus was first identified in California in 1962. EV-D68 can cause mild to severe respiratory illness. Mild symptoms may include fever, runny nose, sneezing, cough, and body and muscle aches. Severe symptoms may include wheezing and difficulty breathing. Since EV-D68 causes respiratory illness, the virus can be found in an infected person's respiratory secretions, such as saliva, nasal mucus, or sputum. EV-D68 likely spreads from person to person when an infected person coughs, sneezes, or touches a surface that is then touched by others. In the United States, people are more likely to get infected with enteroviruses in the summer and fall. In general, a mix of enteroviruses circulates every year, and different types of enteroviruses can be common in different years. Small numbers of EV-D68 have been reported regularly to CDC since 1987. However, in 2014 the number of people reported with confirmed EV-D68 infection was much greater than that reported in previous years. In general, infants, children, and teenagers are most likely to get infected with enteroviruses and become ill. That is because they do not yet have immunity (protection) from previous exposures to these viruses. We believe this is also true for EV-D68. Adults can get infected with enteroviruses, but they are more likely to have no symptoms or mild symptoms. Children with asthma may have a higher risk for severe respiratory illness caused by EV-D68 infection.

Other disasters, such as those resulting in the loss or contamination of water supplies, may result in an increased probability of disease. In fact, following most major disasters, disease is a primary concern due to the lack of sanitation. More specifically, long-term power outages can lead to household food contamination, and flooded properties often develop mold or mildew toxins. Flood water frequently contains hazardous bacteria and chemicals.

Animal and Plant Disease

Animal and plant diseases, particularly those that infect livestock or crops, can distress the agricultural community. Such diseases could lead to food shortages and negative economic impacts, depending on the animals or plants infected and the geographic extent of the disease. The North Dakota Department of Agriculture is charged with conducting regular and emergency inspections and licensure of animal and plant producers and shippers. The effects of these regulatory activities are to mitigate any effects from contaminated or suspect products entering the food chain.

Many plant and crop diseases exist. Of most concern are those diseases that spread rapidly and cause widespread economic losses. The specific diseases that could cause plant epidemics depend on the species. Of particular concern in Bottineau County would be those diseases that affect wheat, soybeans, dry beans, corn, sunflowers, forage, or barley. Examples of plant diseases on the US Department of Agriculture, Animal and Plant Health Inspection Service Select Agent and Toxin List that could have serious impacts on Bottineau County crops include Red Lead Blotch of Soybean, Philippine Downy Mildew and Brown Stripe Downy Mildew. (US Department of Agriculture, 2013) Many other diseases also exist that could have devastating impacts such as Karnal Bunt of Wheat, Black Stem Rust Race UG99, and Soybean Rust.

4.1.2. Geographic Location

Communicable diseases, whether human, animal, or plant are not governed by geographic boundaries. However, those jurisdictions with the highest human and livestock populations and crop exposure are at greatest risk from communicable diseases. In Bottineau County, this would include the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City. The rural areas of Bottineau County are not as prone to human disease because of the population dispersion but are more susceptible to crop and livestock disease outbreaks.

4.1.3 Previous Occurrences

Human Disease

Fortunately, Bottineau County has not experienced any significant disease outbreaks within its population in recent years. Approximately three human influenza pandemics have occurred over the past 100 years, one severely affecting the United States. Following World War I, the Spanish influenza pandemic of 1918 killed 20-40 million people worldwide, including 675,000 Americans. (Billings, 1997) In North Dakota, about 2,700 people died and around 6,000 people were infected. Schools, churches, and businesses were closed for a time, and public gatherings were banned. Transporting influenza patients by train was a crime. (US Department of Health and Human Services, 2006)

During the H1N1 pandemic, the CDC provided estimates of the numbers of 2009 H1N1 cases, hospitalizations and deaths on seven different occasions. Final estimates were published in 2011. These final estimates were that from April 12, 2009 to April 10, 2010 approximately 60.8 million cases (range: 43.3-89.3 million), 274,304 hospitalizations (195,086-402,719), and 12,469 deaths (8868-18,306) occurred in the United States due to pH1N1. Source: http://www.cdc.gov/h1n1flu/estimates_2009_h1n1.htm. As of mid-April, 2015, over 6100 people in North Dakota have contracted the flu this season with the number of flu deaths up to 54. The average number of flu cases for a flu season usually ending in May, is 2,800. The reason for the 2015 outbreak is the flu vaccine has been determined to be relatively ineffective.

Another disease that annually affects both humans and animals in Bottineau County has been West Nile Virus. In the past 5 years, the county has had 3 cases of West Nile Virus (2013-2, 2010-1). (USGS, 2015) The West Nile Virus is not especially deadly for humans, but can be debilitating, especially for the elderly population.

To prevent E. coli outbreaks, Bottineau County has a vigorous inspection program. For instance, some bacterial causing foodborne illness can cause permanent kidney failure or death. Recent data suggests that some of these infections can cause health effects long after the acute infection has been resolved. Foodborne infections commonly occur in outbreaks which can be local (family, restaurant, community social gatherings) or national in scope. Not all outbreaks in the state are identified or reported to public health. Prevention involves controlling the entry of bacteria into food products, proper handling of food to prevent the growth of the bacteria and proper food preparation to ensure the organisms are killed before the food is consumed. Salmonella, Shigella, Campylobacter, and Shiga-toxin positive E. coli are food borne bacteria. Source: North Dakota Department of Health; Note: Other significant causes of foodborne illness not included here do occur and are monitored by NDDoH.

In 1900, nearly all of the leading causes of death were infectious; now only pneumonia and influenza remain among the top 10 causes of death. The number of deaths due to pneumonia and influenza are tracked by the NDDoH by influenza year, which begins in September. The rate is age adjusted to the standard 2000 census. NDDoH's goal is less than 60 deaths per 100,000 people. Bottineau County has not had any communicable disease declared disasters or emergencies. (North Dakota Department of Health, 2015)

Ebola is not a new disease on the world front. The Ebola virus causes an acute, serious illness which is often fatal if untreated. Ebola Virus Disease (EVD) first appeared in 1976 in 2 simultaneous outbreaks, one in Nzara, Sudan, and the other in Yambuku, Democratic Republic of Congo. The latter occurred in a village near the Ebola River, from which the disease takes its name. At the time of Bottineau County's Multi-Hazard Mitigation Plan development, West Africa is experiencing the largest and most complex Ebola outbreak since the Ebola virus was first discovered in 1976. There have been more cases and deaths in this outbreak than all others combined. It has also spread between countries starting in Guinea then spreading across land borders to Sierra Leone, Liberia, Nigeria, and Senegal. Cases were diagnosed in the United States (Texas) in October 2014 resulting in one death. Ebola is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found ill or dead or in the rainforest. EVD then spreads through human-to-human transmission via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids. At this time it is unknown how widespread the EVD will be in the United States.

Measles is a disease that many people in the United States thought was eradicated. That plus the surfacing of unfounded rumors spreading throughout the country about the effects of the measles vaccination, that it was harmful to the child, caused some parents to not vaccinate their children. The low vaccination rate caused an outbreak in measles in 2014 and early in 2015. From January 1 to April 17, 2015, 162 people from 19 states and the District of Columbia were reported to have measles. States neighboring or close to North Dakota included MN (1), NE (2), SD (2).

Measles Cases and Outbreaks

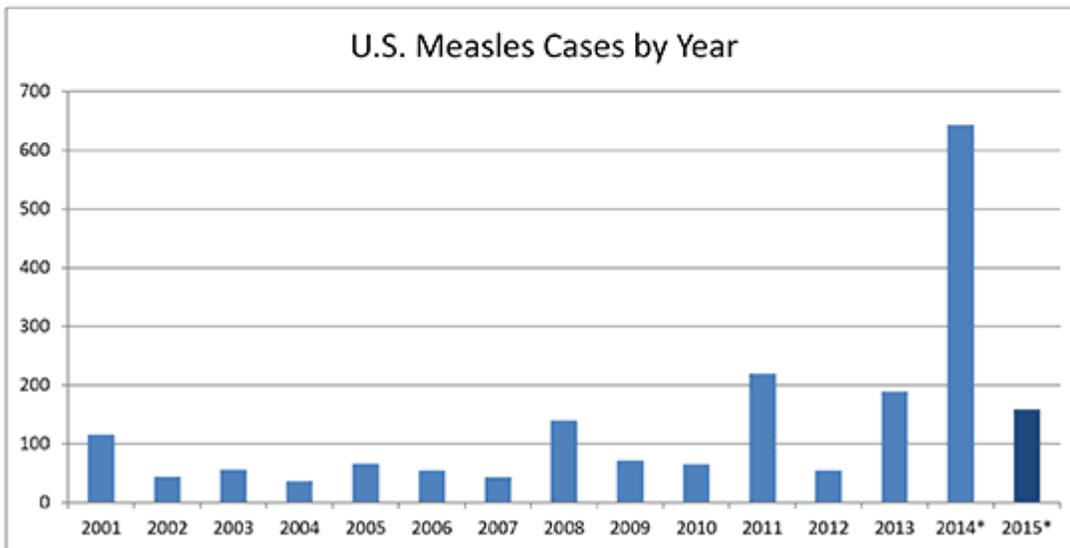
January 1 to May 1, 2015*

169
Cases

reported in 20 states and the District of Columbia: Arizona, California, Colorado, Delaware, Florida, Georgia, Illinois, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, Nevada, Oklahoma, Pennsylvania, South Dakota, Texas, Utah, Washington

5
Outbreaks

representing 89% of reported cases this year



*Provisional data reported to CDC's National Center for Immunization and Respiratory Diseases



The Center for Disease Control has concluded the following:

- The majority of people who got measles were unvaccinated.
- Measles is still common in many parts of the world including some countries in Europe, Asia, the Pacific, and Africa.
- Travelers with measles continue to bring the disease into the U.S.
- Measles can spread when it reaches a community in the U.S. where groups of people are unvaccinated.

Reference: <http://www.cdc.gov/measles/cases-outbreaks.html>

Pertussis or whooping cough is surfacing again in North Dakota in 2015. The disease is not life threatening for adults unless they have underlying lung problems such as chronic obstructive pulmonary disease while babies and the elderly can die from the disease. The small airways of a baby can clamp down due the inflammation and they may have respiratory failure. The North Dakota Department of Health recommends children receive five doses of the DTaP vaccine (whooping cough) starting at 2 months of age with the final round administered before starting elementary school. The vaccine is required to attend school or childcare, another vaccine is recommend at 11-12 years of age, DTaP is required to enter the seventh grade. Parents can opt their kids out for philosophical, moral, religious, or medical reasons.

Animal Disease

Rabies

Rabies is an animal disease that is tracked very closely by the North Dakota Health Department. Between 11-23 total animals were tested, with two being positive for rabies in 2012 within Bottineau County. Source: North Dakota Health Department

<http://www.ndhealth.gov/disease/Rabies/Rabies2012.htm>

Anthrax

Anthrax occurs worldwide and is associated with sudden death of cattle and sheep. Anthrax can infect all warm-blooded animals, including humans. The anthrax organism (*Bacillus anthracis*) has the ability to form spores and become resistant to adverse conditions. Pasteurization or ordinary disinfectants may destroy anthrax organisms in animals or their secretions. However, if the animal carcass is opened and the organisms are exposed to air, they will form spores. Sporulated anthrax organisms are highly resistant to heat, cold, chemical disinfectants and drying. The anthrax spore may live indefinitely in the soil of a contaminated pasture or yard.

In 2012, the Veterinary Diagnostic Laboratory at North Dakota State University confirmed the diagnosis of anthrax in a beef cow. At that time, State Veterinarian Dr. Susan Keller warned —producers should contact their veterinarians to determine when and if their animals should be vaccinated and that their boosters are up to date. —They should also monitor their herds for unexpected deaths and report them to their veterinarians. Dry pastures and short grass in some parts of the state are ideal conditions for livestock to ingest anthrax spores and develop the disease. Twelve cases of anthrax were reported in 2000 and three cases were reported in 2005 for Bottineau County. Source: North Dakota Department of Agriculture

In 2013 the USDA has confirmed that porcine epidemic diarrhea virus (PEDV) has been identified in the United States for the first time through testing at the National Veterinary Services Laboratory. This is not a new virus, nor is it a regulatory/reportable disease. Since PEDV is widespread in many countries, it is not a trade-restricting disease, but rather a production-related disease. PEDV may appear clinically to be the same as transmissible gastroenteritis (TGE) virus with acute diarrhea. Producers will need to work with their herd veterinarian with if any TGE-like symptoms appear and as always, maintain strict biosecurity protocols. Porcine epidemic diarrhea virus (PEDV) is a virus similar to transmissible gastroenteritis (TGE), another disease only affecting pigs. It is not zoonotic, so therefore it poses no risk to other animals or

humans. Also, it poses no risk to food safety. PEDV has been identified in the United States in a small number of herds. The virus is not a new virus as it was first recognized in England in 1971. Since then, the disease has been identified in a number of European countries, and more recently in China, Korea and Japan. USDA, State Animal Health Officials, the American Association of Swine Veterinarians and veterinarians at the National Pork Board are actively monitoring this disease and will make recommendations to producers as necessary. PEDV is transmitted via the fecal-oral route and may appear to be the same as transmissible gastroenteritis (TGE) virus with acute diarrhea within 12 to 36 hours of onset. Herd veterinarians remain well versed in managing TGE-like diseases.

Foot-and-mouth disease or hoof-and-mouth disease (*Aphthae epizooticae*) is an infectious and sometimes fatal viral disease that affects cloven-hoofed animals, including domestic and wild bovid. The virus causes a high fever for two or three days, followed by blisters inside the mouth and on the feet that may rupture and cause lameness. Foot-and-mouth disease (FMD) has severe implications for animal farming, since it is highly infectious and can be spread by infected animals through aerosols, through contact with contaminated farming equipment, vehicles, clothing, or feed, and by domestic and wild predators. Its containment demands considerable efforts in vaccination, strict monitoring, trade restrictions, and quarantines, and occasionally the killing of animals. Susceptible animals include cattle, sheep, goats, pigs, deer, and bison. Llamas and alpacas are known to be infected and usually develop mild symptoms, but are resistant to the disease and do not pass it on to others of the same species. In laboratory experiments, mice, rats, and chickens have been successfully infected by artificial means, but they are not believed to contract the disease under natural conditions. Humans are very rarely infected. There have not been any recent cases in Bottineau County but Europe and Africa have had outbreaks.

Plant Disease

Plant pests and diseases have the potential to cause major disruptions in agricultural production/exports or significant damage to native plant communities and their associated wildlife in Bottineau County.

Significant pests or diseases which would trigger either emergency quarantines, or an emergency action response include:

1. **Karnal bunt disease of wheat:** Karnal bunt (also known as partial bunt or scab) is a fungal disease of wheat, durum wheat, and triticale which are crops extremely important to Bottineau County. The fungus *Tilletia indica* invades the kernels, leaving behind waste products with a disagreeable odor and also that makes bunted kernels too unpalatable for use in flour and processing. The disease occurs in many parts of the world. Grain from these countries is prohibited for import to the United States. In North Dakota, Animal and Plant Health Inspection Service (APHIS) annually provides funds and cooperates with the North Dakota Department of Agriculture to operate a detection survey across the state. During the 2012 Survey, Karnal bunt was not detected. A total of 253 composite samples (226 HRSW and 27 durum) were collected from 63 elevators representing 50 of 53 North Dakota counties. Detection of Karnal bunt would have an immediate negative effect on exports if detected. North Dakota's trading partners (including states and countries) would establish immediate quarantines against the state prohibiting movement of grain and seed. Appearance of the disease in Arizona in early 1996 resulted in APHIS implementing an emergency quarantine, inspection, and certification program for wheat moving out of the infested areas, along with

regulations on sanitizing machinery and storage facilities. Many foreign countries have a zero tolerance for Karnal bunt in import shipments and closed markets. Since that time, detection surveys, eradication programs, and establishment of regulated areas have been successful in restoring lost markets. Karnal bunt can occur in any year in Bottineau County with specific humidity and temperature conditions during the flowering period of small grains. However, farmers have been educated on the susceptibility of the disease during these conditions, and are proactive in applying fungicides to counteract these conditions. Karnal bunt resistance small grain varieties have also been developed in the prevention of the disease.

- 2. Wheat Stem Rust – Ug99 (Race TTKSK):** Wheat stem rust (*puccinia graminis f.sp.tritici*) is historically the most damaging disease of wheat. The disease has the capacity to turn a healthy looking crop, only weeks away from harvest, into nothing more than a tangle of black stems and shriveled grains at harvest. Under suitable conditions yield losses of 70% or more are possible. Wheat stem rust is highly mobile, spreading rapidly over large distances by wind or via accidental human transmission (infected clothing or plant material). Wheat stem rust has largely been under control for over three decades due to the widespread use resistant cultivars. In 1999, a new virulent race of stem rust was identified from wheat fields in Uganda – popularly known as Ug99 after the year and country of discovery. Using North American scientific nomenclature, Ug99 is known as race TTKSK. Ug99 (Race TTKSK) is a cause for concern as it exhibits unique virulence patterns. No other race of stem rust has been observed to overcome so many wheat resistance genes, including the very important gene Sr31. By 2007, Ug99 (Race TTKSK) had spread via wind movements out of East Africa, into Yemen and as far as Iran. Rust pathogens change rapidly, often by mutation. Six additional variants are now recognized in the Ug99 lineage. All exhibit an identical DNA fingerprint, but differ in virulence patterns. Additional important resistance genes have now been defeated by variants of Ug99. Ug99 or variants are considered a major threat to wheat production with an estimated 80-90% of global wheat cultivars susceptible.

Sources: <http://www.ag.ndsu.edu/pubs/smgrains/pp1361.pdf> <http://www.fao.org/agriculture/crops/rust/stem/rust-report/stem-ug99racettksk/en/>

- 3. Emerald ash borer:** The Emerald ash borer is a wood boring beetle causing wide spread impact to North American ash tree forest resources but is not known to occur yet in Bottineau County. The closest known infestations are in areas of Minneapolis/St. Paul. The beetle has been responsible for killing millions of ash trees in Michigan alone. Unfortunately, green ash trees typical of North Dakota forests are susceptible to the insect. Green ash is North Dakota's most dominant tree and extremely important forest resource. Wildlife species that are dependent on healthy forests would also be indirectly impacted. The potential cost of tree removal to homeowners, urban parks, and hazard trees in other areas of North Dakota is estimated to be in the tens of millions of dollars. In 2013 North Dakota participated in the National EAB survey. A total of 393 traps were deployed. Emerald Ash borer was not detected.
- 4. Dutch Elm Disease:** The American Elm tree is one of the primary shade trees in Bottineau County. The American Elm has been affected by Dutch Elm disease throughout the country and the state as well as Bottineau County.

5. **Pale and/or Golden potato cyst nematodes (PCN):** *Globodera pallida* (pale cyst nematode) and *Globodera rostenciensis* (golden nematode) is a regulatory significant nematode pest of potato. A national survey was initiated after the 2006 discovery of cysts in Idaho. To date, it has not been found in any other state. A successful eradication and management program was established in Idaho. The program's goals include stopping the spread, delimiting the infested area, and preserving and restoring lost export markets. Early detection of PCN is critical to minimizing impacts to the export market and agricultural production as well as maintaining product quality, and management/eradication costs. In North Dakota, the PCN Survey is dependent upon cooperation between USDA APHIS PPQ, the North Dakota State Seed Department, the North Dakota Department of Agriculture, and participating growers. In North Dakota, systematic soil sampling is conducted to determine the presence or absence of regulated potato cyst nematodes (PCN) throughout the State's potato growing region. Procedures used are those described in the United States/Canada agreement for the survey. Following these guidelines officially demonstrates the State's negative pest status, ensuring results will be recognized by Canada facilitating the movement of seed potatoes across the US border. North Dakota participated in the National PCN Survey. A total of 1,018 samples were collected in the spring and 2,627 samples were collected in the fall of 2012. No *Globodera* species detected.
6. **Soybean Cyst Nematode (SCN):** Soybean cyst nematode is the most important soybean pathogen in the United States. The nematode attacks the roots causing major damage to the plant. It was first found in the United States in 1954 in North Carolina, and has spread throughout soybean growing area of the Midwest, southeast, and eastern seaboard. Western Minnesota and Northern South Dakota Counties are affected by the Soybean Cyst Nematode. In August 2003, it was found in eastern North Dakota, but the number of infested soybean acres has not yet been determined. SCN can easily spread through contaminated field equipment, wind-blown or water carried soil, by animal or by soil "peds" (small clumps of soil) , and in seed harvested from infested fields. Yellowing of the foliage (chlorosis) in July or August, stunting of plants, thin stands, and slow closing of rows are observed aboveground symptoms of the pathogen. Management of SCN has two goals: preventing the infestation of soybean fields and reducing the nematode population in infested fields. The use of cultural practices, such as adequate soil fertility, and reducing plant stress from weeds, insects, etc... to promote good growth of soybean will reduce the damaging effects of SCN. Other prevention methods include thoroughly cleaning equipment from infested fields, avoiding the use of seed harvested from an infested field, and using tillage or other practices that reduce the wind or water transport of soil and debris from infested to non-infested fields. Crop rotation to non-hosts and the use of host resistance are the principal methods of reducing the nematode populations.

Source: <http://www.ndsu.edu/pubweb/~bernelso/soydiseases/cyst.shtml>

4.1.4 Probability and Magnitude

Table 4.1.4A is a graphical representation of the range of events that can occur within the disease hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the communicable disease hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.1.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				Smallpox
	<i>No local history</i>			Severe Strain	Outbreak
	<i>100 years</i>		Mild Strain	Influenza	
	<i>50 years</i>	Food Borne	Influenza		
	<i>Annually</i>	Illnesses			
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

Quantifying the probability of a human epidemic affecting Bottineau County presents challenges due to a limited history of outbreaks. Medical advances over the past fifty years prevent many disease outbreaks, yet the potential still remains. Much of the county is in a rural setting, and therefore, is somewhat isolated from the rapid spread of global diseases which would occur faster in other more populous areas of the state.

The cities in Bottineau County that are more prone to disease outbreaks are Bottineau, Lansford, Newburg, Westhope, and Willow City. The other smaller communities are not as vulnerable to diseases as their populations do not support major spreading. Transmittable diseases are more easily spread among populations living in close proximity to each other than people living far apart such as in the county’s rural areas. In addition, the county has eight day care facilities which provide close quarters for the spread of disease. Source: http://childcarecenter.us/county/bottineau_nd#.VQxpxU3wuUk

Animal and plant disease outbreaks are even harder to predict. Most global livestock diseases have been confined to specific countries due to strict import regulations. Any plant disease outbreaks have been relatively easily contained.

The magnitude of a communicable disease outbreak varies from every day disease occurrences to widespread infection. During the 1918 Influenza Pandemic, infection rates approached 28% in the United States. (Billings, 1997) Other pandemics produced infections rates as high as 35% of the total population. (World Health Organization, 2008) Such a pandemic affecting Bottineau County represents a severe magnitude event. Almost any highly contagious, incapacitating disease that enters the regional population could overwhelm local health resources. Similarly, any rapidly spreading bioterrorism event for which little vaccination or containment capability exists is a high magnitude event.

Many of the diseases such as diphtheria, tetanus, and polio that have the potential to result in serious outbreaks are preventable through routine vaccination. Vaccination is so effective that each vaccination actually saves substantially more money than it costs. In parts of the world where vaccination rates are low, these diseases continue to take a high toll in death and disability.

The North Dakota Department of Health monitors the rate of vaccination among children, specifically the percentage of children completing the 4:3:1:3:3:1:1 or 4 DTaP, 3 Polio, 1 MMR, 3 Hib, 3 Hepatitis B, 1 Varicella vaccination series at age 2 years. Vaccination rates have been rising slowly since 2007. The target rate of 90% has been set by the ND Department of Health. The coverage rate for Bottineau County Kindergarten children in 2013-2014 is 96% for the major diseases. In 2013-2014, the rate of vaccination for North Dakota children was between 89.8 percent and 94.26 for the major diseases.

Source: <http://www.ndhealth.gov/Immunize/Rates/State.aspx?&ThisYear=2013-2014>

The magnitude of an infectious disease outbreak is related to the ability of the public health and medical communities to stop the spread of the disease. Most disease outbreaks that cause catastrophic numbers of deaths are infectious in nature, meaning that they are spread from person to person. The key to reducing the catastrophic nature of the event is to stop the spread of disease. This is generally done in three ways: (1) identification and isolation of the illness, (2) quarantine of those exposed to the illness to prevent further spread, and (3) education of the public about methods to prevent transmission. The public health and health care providers in North Dakota routinely utilize all three methods to reduce morbidity and mortality from infectious disease. However, the capacity of the health care system is limited. For example, local health jurisdictions have specific pandemic influenza response plans, and mass prophylaxis plans, but most jurisdictions have only a few staff members. Many local health jurisdictions would need to rely on volunteers, pre-scripted messages and procedures and the cooperation of the public in order to respond effectively to a large scale pandemic. Similarly, hospitals in North Dakota have emergency response and pandemic influenza plans, but little excess capacity exists to care for and/or isolate hundreds, even thousands of patients. Because of these limitations in personnel, facilities, and equipment, the health care community is planning to utilize “social distancing” measures. These measures which could include closure of schools, day cares and other public events would have far-reaching economic impacts on communities and might shutdown facilities for 30 days or more. Closure of the day cares or schools would have a serious impact on the economy as parents might not be able to find child care elsewhere.

4.1.5 Risk Assessment

Vulnerability Overview

The most significant impacts of communicable disease are to the population affected and the healthcare organizations involved. Disease can spread rapidly through schools, health facilities, and communities. The entire county population plus visitors are at risk to contracting a communicable disease that surface in Bottineau County. Although infectious diseases are not subject to geographic boundaries, several populations in Bottineau County are specifically at higher risk to infectious diseases. Communicable diseases are most likely to spread quickly in institutional settings such as long-term care facilities, day care facilities, schools, correctional institutions, etc. The number of infections and fatalities in the county

depends on the transmission and mortality rates. The county economy relies heavily on the agriculture, health care, travel, and manufacturing industries, and therefore, human or livestock diseases would negatively affect the economy. With respect to human diseases, an outbreak would most certainly limit travel and impact the service and tourism industries. The trickle-down economic impacts to nearly all industries could be overwhelming. Workers that become ill, need to care for loved ones, or are fearful of contracting the disease may not show up for work. The impact to critical industries and services could be severe. Examples of industries and services that could be significantly impacted in Bottineau County include health care, education, and emergency response.

Human Disease

The entire county is vulnerable to a major disease outbreak. As evidenced by annual infectious disease reports and reports of investigations completed by the North Dakota Department of Health, many counties experience one or multiple disease outbreaks each year. Potential casualty losses are anticipated to be greatest in areas with higher populations, higher pediatric populations and higher elderly populations as well as larger populations living in group quarters. Bottineau County has a moderate population in the state regarding these vulnerable groups, including populations under age 5, over age 65 and those living in group quarters. From the 2010 census, Bottineau County has a total population of 6,429 with 6.4% of the population below 5 years of age and 21.0% is over the age of 65 for a total of 27.4% of the population.

Source: <http://quickfacts.census.gov/qfd/states/38/38031.html>

Health professional shortage areas and rural areas are more susceptible to having limited medical capabilities and by extension are more susceptible to the possibility of being overwhelmed because of a large surge of patients seeking care. Bottineau County currently has one hospital listed under the national Health Professional Shortage Area (HPSA) which is St. Andrew’s Health Center. Mohall’s Trinity Community Clinic in Renville County, which services the western portion of Bottineau County, is also on the HPSA list.

Source: http://datawarehouse.hrsa.gov/DataDownload/FRN/D_BCD_HPSA_H1_FederalRegister.pdf

Using a general estimate of 35% for the infection rate and a mortality rate (once infected) of 20%, as can be the case in an influenza pandemic, approximately 2,250 residents of Bottineau County would be infected with about 1,286 fatal infections. This estimate is somewhat extreme, but uses plausible infection and mortality rates.

As with any disease, age and other health conditions can be contributing factors. The ability to control the spread of disease depends on the virulence of the disease, the time lapse before the onset of symptoms, the movement of the population, and the warning time involved. Vaccinations, anti-virals, quarantines, and other protective measures may also prevent the spread and impact of the disease.

Taking into consideration age alone disease susceptibility criteria, it is considered children under age 14 and adults over the age of 65 are most susceptible to disease. Gardena has the lowest susceptibility to the spread of communicable disease whereas Kramer has the highest susceptibility. The other cities do not vary much from the county average. The table below depicts the ages of the Bottineau County and its cities by percentage of the population.

Table 4.1.5A Percentage of population under 14 and over 65 years of age (2010 Census)

Jurisdiction	Population	% of population age under 14 Years	% of Population over 65 Years	Total %
Countywide	6,429	980 – 15.2%	1382 – 21.5%	36.7%
Antler	27	2 – 7.4%	9 – 33.3%	40.7%
Bottineau	2,211	323 – 14.6%	547 – 24.7%	39.9%
Gardena	29	3 – 10.3%	5 – 17.2%	27.5%
Kramer	29	3 – 10.3%	16 – 55.2%	65.5%
Landa	38	9 – 23.7%	8 – 21.1%	44.8%
Lansford	245	54 – 22.0%	19 – 7.8%	29.8%
Maxbass	84	15 – 17.9%	13 – 15.5%	33.4%
Newburg	110	26 – 23.6%	18 – 16.4%	40.0%
Overly	18	4 – 22.2%	5 – 27.8%	50.0%
Souris	58	8 – 13.8%	14 – 24.1%	37.9%
Westhope	429	58 – 13.5%	100 – 23.3%	36.8%
Willow City	163	19 – 11.7%	43 – 26.4%	38.1%

Source: http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml

Table 4.1.5B Vulnerable Populations by close living conditions

Facility Name	Type	Location	Population
St. Andrew’s Health Center	Hospital	Bottineau	25 Bed
St. Andrew’s Health Center Apartments	Living	Bottineau	14 Apartments
Good Samaritan Nursing Home	Living	Bottineau	65 Beds
Bottineau Public Schools (K-12)	School	Bottineau	651 Students
Westhope Public Schools (K-12)	School	Westhope	70 Students
Dakota College	College	Bottineau	169 On-Campus Students
Oak Manor	Living	Bottineau	30 Apartments
Janet Bechtold	Daycare	Bottineau	18 Children
Charlotte Bedlion	Daycare	Bottineau	18 Children
Heather Belcourt	Daycare	Bottineau	17 Children
Jodi Gustafson	Daycare	Bottineau	16 Children
Cindy Lagasse	Daycare	Bottineau	10 Children
Patty Monson	Daycare	Bottineau	18 Children
Louise Schneiderman	Daycare	Bottineau	9 Children
Rachael Stewart	Daycare	Bottineau	15 Children
Candace Trottier	Daycare	Westhope	12 Children
Samantha Werner	Daycare	Newburg	18 Children
Lupe Wuster	Daycare	Bottineau	15 Children
Ann Zorn	Daycare	Bottineau	18 Children
Building Blocks Learning Center	Center	Bottineau	65 Children
Sandra Anderson	Family Provider	Lansford	9 People
Lynette Dubois	Self-Declared	Bottineau	5 Children

Nancy Erickson	Self-Declared	Westhope	5 Children
Agnes Schumacker	Self-Declared	Westhope	5 Children

**Table 4.1.5B illustrates vulnerable populations based on close living conditions. This includes schools, day care centers, and nursing homes.*

Animal Disease

Animal diseases extending nationally would have an overarching effect on the national economy. More directly, though, Bottineau County’s economy relies heavily on the agricultural industry. A communicable livestock disease would negatively affect the agricultural economy and could also limit food supplies. In 2007, Bottineau County had market value crop sales \$241,696,000 and livestock sales of \$12,336,000 and depending on the crop affected, severe crop losses could be seen, having a trickle-down effect on the agricultural feed supply (US Department of Agriculture, 2012). Additionally, Bottineau County had 12,548 Cattle and Calves, 678 head of sheep and lambs, and 6,033 hogs and pigs based on 2012 USDA data. There is an average of about 5,000 brute sows and 7,500 piglets, under 21 days old, on the facility West of Bottineau alone.

Plant Disease

According to the 2012 Census of Agriculture, Bottineau County had 863 farms covering 772,989 acres with annual cash income totaling nearly \$130 million in 2012. Additionally, should a disease be especially severe for a particular species, that species could be eradicated from the county resulting in ecologic imbalances.

Crop diseases are naturally occurring incidents. Farmers today are better equipped to manage crop diseases than in the past. Farmers can better manage these incidents due to the development of crop disease resistance varieties, which have been developed through cooperative land agreements with universities. Farm management practices have greatly improved due to farmer education on weather conditions (heat, rain, drought, cold) which prompt crop disease. Also, the development of fungicides and the timing of application of fungicides to crops are key to preventing disease.

Loss Estimates

Human Disease

Perhaps the most significant impact from communicable disease is to the population. Disease can spread rapidly through schools, the college, health facilities, day-care centers, and communities. The entire county population of 6,429 in addition to the non-residents is at risk for contracting a communicable disease. The number of infections and fatalities in the communities would depend on the transmission and mortality rates.

According to *The annual impact of seasonal influenza in the US: Measuring disease burden and costs* by Molinari et al., nationally the economic burden of influenza medical costs, medical costs plus lost earnings, and the total economic burden were \$10.4 billion, \$26.8 billion and \$87.1 billion respectively. The financial burden of healthcare-associated infections nationally has been estimated at \$33 billion annually. There is no data currently available on the economic impact of previous influenza pandemic illness in Bottineau County. Using pandemic influenza as the worst-case scenario for estimating potential losses, the North

Dakota Department of Health's Pandemic Influenza Planning includes the following vulnerability estimates. It has been estimated that a medium-level pandemic, using the CDC scenario estimates of a 30% infection rate, a 0.8% hospitalization rate among the ill, and a 0.2% mortality rate among the ill, in Bottineau County:

1. 1,929 persons would become ill and may require outpatient care
2. 52 persons may require hospitalization
3. 13 persons may die

Source: North Dakota Department of Health, Pandemic Flu Loss Estimates

Additionally, the U.S. Centers for Disease Control and Prevention (CDC) estimates 76 million people suffer foodborne illnesses each year in the United States, accounting for 325,000 hospitalizations and more than 5,000 deaths. Foodborne disease is extremely costly. Health experts estimate that the yearly cost of all foodborne diseases in this country is \$5 to \$6 billion in direct medical expenses and lost productivity. Infections with the bacteria Salmonella alone account for \$1 billion yearly in direct and indirect medical costs.

Animal Disease and Plant Disease

It is difficult to estimate losses to animal and plant disease due to the variables involved. Assuming a loss estimate if disease resulted in 20 percent loss to crops and livestock, Bottineau County loss would be \$48,339,200 in crops and \$2,467,200 in livestock/product.

4.1.6 Critical Facilities in Hazard Prone Areas

In some instances, the accessibility and functionality of critical facilities can be compromised by communicable diseases until the facility is decontaminated or the threat has passed. With the loss of function of facilities supporting emergency response, delays in emergency services could result. Additionally, with a significant human disease outbreak, resources such as ambulance service and the hospitals could quickly become overwhelmed.

Should a building become contaminated by some disease agent, clean-up costs and the loss of use of the buildings could result. Such costs could be significant. For example, the cost for the EPA to decontaminate the buildings affected by the 2001 anthrax letters was priced at \$320 million. (CIDRAP, UM) For this reason, all critical facilities are assumed to be at some risk from communicable disease.

Diseases can spread quickly in facilities housing vulnerable populations such as schools, dormitories, and elderly housing. Often these facilities, as well as the hospitals and medical clinics, are the first places where diseases are identified and treated.

In most cases, critical infrastructure would not be affected by communicable disease. Scenarios that would affect infrastructure include the contamination of the water supplies and diseases that require special provisions in the treatment of wastewater. Should an epidemic necessitate quarantine or incapacitate a significant portion of the population, support of and physical repairs to infrastructure may be delayed, and services may be disrupted for a time due to limitations in getting affected employees to work.

4.1.7 Development in Identified Hazard Areas

Structures built as a result of new development would have little impact on the communicable disease vulnerabilities, unless in the rare case, the new structures were part of a lab dealing with biological agents. New residents and population add to the number of people threatened in Bottineau County, but the location of such population increases would likely not be a significant factor.

4.1.8 Data Limitations and Other Key Documents

The data limitations related to the communicable disease hazard include:

- Uncertainties related to how and when a disease will spread through a population
- The emergence of new, unstudied diseases

Other key documents related to the Communicable Disease hazard include:

- North Dakota Department of Health, Pandemic Influenza Plan
- North Dakota Department of Health, Public Health & Medical All-Hazards Plan
- North Dakota Department of Health, Specific Disease Agent Plans
- North Dakota Department of Agriculture, Foreign Animal Disease Plan
- North Dakota Emergency Operations Plan, Animal Health Annex
- North Dakota Emergency Operations Plan, Infectious Diseases Annex
- North Dakota Emergency Operations Plan, Plant Health Annex
- Bottineau County Public Health

4.2 Dam Failure

Frequency	Unlikely	Less than 1% probability in the next 100 years.
Impact	Negligible	Less than 1% of jurisdiction affected
Risk Class	2	Minor
Seasonal Pattern	Spring during ice melt and summer caused by severe thunderstorms	
Duration	Hours to days	
Speed of Onset	Minutes to days	

Was noted as a class 3 in the THIRA but planning team classified Dam Failure as a risk class '2'.

4.2.1 Description

A dam is any artificial barrier, including appurtenant works, which impounds or diverts water. Dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that can create a potentially significant downstream hazard.

Although not particularly likely, seismic activity, poor maintenance, overwhelming flow conditions, and terrorist activities can all lead to the catastrophic failure of a dam. The result is the rush of water contained by the dam downstream at a rapid pace. The structural integrity of a dam depends on its design, maintenance, and ambient conditions. Dams exist in a variety of shapes, sizes, and materials; uses include recreation, flood control, irrigation, water supply, and hydroelectricity.

Should a dam fail, the consequences can be devastating or minimal depending on the dam’s characteristics and regional attributes. Most dams are classified based on the potential hazard to life and property should the dam suddenly fail. Note the hazard rating is not an indicator of the condition of the dam or its probability of failure. The following hazard categories have been established for North Dakota:

- *Low Hazard:* These dams are located where there is little possibility of future development such as rural or agricultural areas. Failure of low hazard dams may result in damage to agricultural land, township and county roads, and non-residential farm buildings. No loss of life is expected if failure occurs.
- *Medium Hazard:* These dams are located in predominately rural or agricultural areas where failure may damage isolated homes, main highways, railroads, or cause interruption of minor public utilities. The potential for the loss of a few lives exists if the dam fails.
- *High Hazard:* These are dams located upstream of developed and urban areas where failure may cause serious damage to homes, industrial and commercial buildings, and major public utilities. There is a potential for the loss of more than a few lives if the dam fails.

Source: North Dakota State Engineer, 1985

According to the North Dakota State Water Commission database, Bottineau County has 56 dams, all of which are considered low hazard and several of which had ‘voided’ permits. The list can be found at the State Water Commission website and in Table 4.2.1A below. Note the letters “TR” and “OS” in the “Areas of Inundation Should a Breach Occur” column. This is the "federal river class" field referring to the stream on

which the structure is located. **TR stands for Tributary, such as a Tributary of Little Deep Creek. OS stands for off system, meaning that the structure is in that river basin, but not actually on the river.** OS is usually used in reference to ponds that are not located on a stream, or may be used in closed basins or pothole areas where there is not a well-defined stream. It should be noted that smaller dams not tracked by the State Water Commission are located in rural areas throughout Bottineau County and have the potential to fail, impacting structures and disrupting economic activity in the county.

Table 4.2.1A, Bottineau County Dams

Structure Name	Purpose	Year Built	Hazard Category	Acreage (Ac-Ft)	Areas of Inundation Should a Breach Occur
Ron Undlin Dam	Livestock	1951	Low	23.5	Agricultural Land (Little Deep Creek-TR)
Richard Rude Dam	Fish & Wildlife	1991	Low	2.5	Agricultural Land (Willow Creek-TR)
Robert Howard Dam 1	Fish & Wildlife	1992	Low	1.8	Agricultural Land (Souris River-TR)
Robert Howard Dam 2	Fish & Wildlife	1992	Low	1.1	Agricultural Land (Souris River-TR)
Deep River Dam	Recreation	1934	Low	193.9	Agricultural Land (Deep River)
Gertrude Kersten Dam	Recreation	1993	Low	206.0	Agricultural Land (Laporte Coulee)
Dale Thorenson Dam	Irrigation	1992	Low	342.0	Agricultural Land (Laporte Coulee)
Lords Lake Dam	Fish & Wildlife	1937	Low	5,253.0	Agricultural Land (Willow Creek-TR)
Greg Sletto Dam	Fish & Wildlife	1960	Low	34.5	Agricultural Land (Oak Creek)
Dianne Scheflo Dam	Fish & Wildlife	1993	Low	0.8	Agricultural Land (Souris River-TR)
Eugene Glessing Dam	Fish & Wildlife	1950	Low	1.7	Agricultural Land (Cut Bank Creek-TR)
Hutton WPA	Fish & Wildlife	1933	Low	28.4	Agricultural Land (West Cut Bank Creek-TR)
Mohall Supply Dam	Water Supply	0000	Low	4.0	Agricultural Land (Cut Bank Creek)
Mark DeMontigny Dam	Fish & Wildlife	2010	Low	1,050.0	Agricultural Land (<i>No River Class</i>)
Keith Knudson Dam	Fish & Wildlife	2014	Low	322.0	Agricultural Land (Oak Creek-TR)
Carbury Dam	Recreation	1982	Low	1,282.0	Agricultural Land (Carbury Creek)
Robert Brown Dam	Recreation	2008	Low	6.5	Agricultural Land (Stone Creek-TR)
Holsten Slough WPA	Fish & Wildlife	1985	Low	180.0	Agricultural Land (Boundary Creek)
Jerry Opdahl Dam	Fish & Wildlife	1990	Low	39.0	Agricultural Land (Souris River-TR)
James Houmann Dam	Fish & Wildlife	1990	Low	50.0	Agricultural Land (Souris River-TR)
Daryl Peterson Dam	Fish & Wildlife	1992	Low	7.1	Agricultural Land (Souris River-OS)
Mohall Golf C. Dam	Irrigation	1984	Low	2.0	Golf Course (not Clubhouse) (West Cut Bank Creek)
Bill McCullough Dam	Fish & Wildlife	1996	Low	10.7	Agricultural Land (Willow Creek-TR)
Viola Rude Dam	Livestock	1996	Low	0.0	Agricultural Land (Not significant)
NDFS (Wetland 19)	Fish & Wildlife	1996	Low	3.5	Swamp/Forrest land (Pelican Lake-TR)
NDFS (Wetland 11)	Fish & Wildlife	1996	Low	3.0	Swamp/Forrest Land (Norberg Lake-TR)
NDFS (Wetland 9)	Fish & Wildlife	1996	Low	6.6	Swamp/Forrest Land (Long Lake-TR)
NDFS (Wetland 10)	Fish & Wildlife	1996	Low	6.3	Swamp/Forrest Land (Long Lake-TR)
Long Lake Structure	Other	2003	Low	2,240.0	Another Lake (Hellick Lake/Long Lake)
Ken Rude Dam 2	Fish & Wildlife	1999	Low	10.9	Agricultural Land (Willow Creek-OS)
Ken Rude Dam 1	Fish & Wildlife	1999	Low	9.1	Agricultural Land (Willow Creek-OS)
Ardeen Larson Dam	Fish & Wildlife	1996	Low	6.8	Agricultural Land (Oak Creek-TR)
Kyle Rude Dam	Fish & Wildlife	1999	Low	10.1	Agricultural Land (Willow Creek-TR)
Dunlop/Thompson Dam	Fish & Wildlife	1996	Low	9.7	Agricultural Land (Willow Creek-TR)
Lake Metigoshe	Recreation	1961	Low	16,140.5	Bottineau City, Oak Creek drainage
NDFS (Wetland 49)	Fish & Wildlife	1996	Low	3.6	Swamp/Forrest Land (Harts Lake-TR)

Curtis Hahn Dam	Fish & Wildlife	1996	Low	12.4	Agriculture Land (Oak Creek-TR)
Johhney Klingenberg Dam	Fish & Wildlife	1998	Low	34.2	Agriculture Land (Willow Creek-OS)
NDFS (Wetland 93-1)	Fish & Wildlife	1993	Low	7.0	Swamp/Forrest Land (Souris River-TR)
NDFS (Wetland 93-6)	Fish & Wildlife	1993	Low	10.6	Agriculture Land (Souris River-TR)
Robert Brandevold Dam	Fish & Wildlife	1996	Low	26.3	Agriculture Land (Oak Creek-TR)
Olson Dam	Flood Control	1972	Low	285.0	2 Farmsteads
Robert Howard Dam 3	Fish & Wildlife	1993	Low	0.2	Agricultural Land
Westhope Country Club	Irrigation	1989	Low	11.6	Golf Course Maintenance Shack and Land
NDFS Dam 96-12	Fish & Wildlife	1996	Low	9.3	Wetland/Swamp (Oak Creek Tributary)
NDFS (Wetland 5)	Fish & Wildlife	1995	Low	3.5	Wetland/Swamp (Souris River-TR)
NDFS (Wetland 6)	Fish & Wildlife	1995	Low	3.0	Wetland/Swamp (Souris River-TR)
NDFS (Wetland 4)	Fish & Wildlife	1996	Low	2.9	Wetland/Swamp (Souris River-TR)
NDFS (Wetland 1)	Fish & Wildlife	1995	Low	5.1	Wetland/Swamp (Souris River-TR)
Antler Creek Dam	Other	1962	Low	80.0	1 Farmstead

The most common causes of dam failure are increased reservation pools levels and seepage related issues.

Hydrologic Failures

Hydrologic failures are typically associated with flood events. A hydrologic failure may occur due to dam overtopping or excessive spillway erosion. A dam can be overtopped during a flood event due to insufficient reservoir storage and insufficient spillway capacity. Earthen dams are particularly susceptible to failure when overtopped since earthen material may erode relatively easily. Some dams have an earthen auxiliary spillway designed to carry excess flows during a flood event. Since these are earthen spillways, some erosion can be expected, but under the right conditions excessive erosion can occur. (North Dakota State Water Commission, 2007)

Seepage Failures

All dams have some seepage occurring through the structure and foundation. Seepage, if uncontrolled, can erode material from the embankment of an earthen dam and lead to complete failure of the dam. Piping is a special seepage problem where erosion starts at the point where seepage is exiting the downstream slope or foundation, then works backwards toward the upstream slope. Internal erosion, another type of seepage failure, occurs when water flowing through the dam causes erosion along a crack in the embankment or foundation, or along some other discontinuity or preferential flow path in the embankment, such as along a spillway conduit. Tree roots and animal burrows can also provide paths for seepage. Seepage failures can occur during the course of normal operations, but can also occur during flood conditions when reservoir levels are abnormally high. (North Dakota State Water Commission, 2007)

4.2.2 Previous Occurrences

Fortunately, Bottineau County has not experienced any catastrophic dam failures as all of the dams are low hazard dams. It is important that local citizens and county officials continue to monitor the dams.

4.2.3 Probability and Magnitude

Table 4.2.4A is a graphical representation of the range of events that can occur within the dam failure hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the dam failure hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.2.3A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				High Hazard Dam Complete Failure
	<i>No local history</i>			Dam Failure with Some Damages	
	<i>100 years</i>				
	<i>50 years</i>		Threatened Dam Failure		
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

The dam failure probability is low based on a minimal history of significant events and the regular inspection and upkeep of the high hazard dams. The probability of a dam failure is very site-specific and dependent on numerous factors, each with their own probability such as the probability of a flood event capable of overtopping a particular dam. The design and condition of the dam also factors into the probability of failure. Should a high or medium hazard dam fail, that event would be considered a high magnitude event. The loss of property, services, and even life could result. The Lake Metigoshe Dam has the potential to produce the greatest magnitude if a dam failure occurred. A failure of this dam is estimated to impact the eastern third of the city of Bottineau. Critical facilities and infrastructure in this estimated inundation area include the Bottineau Middle School, Bottineau High School, a day care center, Dakota College at Bottineau, Oak Manor (an age-restricted facilities containing vulnerable populations), and approximately 324 households.

4.2.4 Risk Assessment

Vulnerability Overview

To complete an analysis of vulnerability to dam failure as well as attempt to describe vulnerability in terms of the jurisdictions most threatened by dam failure, points were assigned to each type of dam and aggregated for a total point score for the county. Points were assigned as follows for each dam:

- Low Hazard Dams, 0 Points
- Medium Hazard Dams, 2 points
- High Hazard Dams, 3 points

- High and Medium Hazard Dams without an Emergency Action Plan (EAP), an additional 2 points.

This analysis does not intend to demonstrate vulnerability in terms of dam structures that are likely to fail, but rather provides a general overview and with weighted consideration given to dams whose failure would result in greater damages. Additionally, it is recognized that failure of dams can impact adjacent downstream counties. This is a recognized data limitation. Table 4.2.5A provides the results of the dam failure vulnerability analysis for Bottineau County.

Table 4.2.5A Bottineau County Dam Failure Vulnerability Analysis Results Table

# of Medium Hazard Dams (2 pts)	# of High Hazard Dams (3 pts)	# of Medium and High Hazard Dams w/o EPA (2 pts)	Weighted Vulnerability Analysis Score	Vulnerability
None	None	None	0	Low

Loss Estimates

If one of the dams in Bottineau County were to fail, the results would be the flooding of agricultural land, mainly used for pasture or hay land. There would be no significant effects on any residential or commercial property.

4.2.6 Critical Facilities in Hazard Prone Areas

Infrastructure, particularly the township Transportation network, is vulnerable to washouts.

4.2.7 Development in Identified Hazard Areas

Current zoning and land use ordinances in Bottineau County do not specifically consider dam inundation areas during the review of new development. Therefore, future development could occur in the potential dam inundation areas. Until inundation areas are more clearly defined and are used by the local jurisdictions during development reviews, the potential for development in the hazard areas exists.

4.2.8 Data Limitations and Other Key Documents

There are no data limitations related to the dam failure hazard in Bottineau County.

Other key documents related to the Dam Failure hazard include:

- Individual Dam Emergency Action Plans
- North Dakota Dam Design Handbook
- North Dakota Emergency Operations Plan, Dam Failure Annex

4.3 Drought

Frequency	Possible	1-10% probability in the next year, or at least 1 chance in the next 10 years
Impact	Moderate	10-25% of jurisdiction affected
Risk Class	3	Moderate Risk
Seasonal Pattern	None - Patterns can last over several season when precipitation is limited but most dramatic effects occur in the summer when temperatures are high and crops are affected	
Duration	Months/Years	
Speed of Onset	Slow onset-A drought occurs over time; therefore, it can be watched and anticipated, but its exact beginning and end are often times difficult to determine.	

4.3.1 Description

Drought is a condition of climatic dryness severe enough to reduce soil moisture below the minimum necessary for sustaining plant, animal, and human life systems. Drought characteristics usually include precipitation levels well below normal and temperatures higher than normal. Under these conditions, topsoil crumbles and is lost due to wind erosion. Streams, ponds, and wells often dry up and water levels in lakes and rivers drastically fall, creating severe strain on vegetation, wildlife, and livestock. Although the agricultural economy may be more negatively impacted, urban economies are also constrained when the amount of domestic and industrial water is in short supply. Prolonged droughts have caused severe economic hardships in Bottineau County.

Scientifically, drought can mean many things to many people, depending on the discipline and perspective of the individual. Operational definitions are used to help quantify the beginning, end, and degree of severity of a drought. The following definitions were provided by the National Drought Mitigation Center:

- *Meteorological drought* is usually an expression of precipitation’s departure from normal over some period of time. These definitions are usually region-specific, and presumably based on a thorough understanding of regional climatology.
- *Agricultural drought* happens after meteorological drought but before hydrological drought. Agriculture is usually the first economic sector to be affected by drought. Agricultural drought occurs when there isn’t enough soil moisture to meet the needs of a particular crop at a particular time.
- *Hydrological drought* refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow and as lake, reservoir, and groundwater levels. There is a time lag between lack of rain and less water in streams, rivers, lakes, and reservoirs, so hydrological measurements are not the earliest indicators of drought. When precipitation is reduced or deficient over an extended period of time, this shortage will be reflected in declining surface and subsurface water levels.

- *Socioeconomic drought* occurs when physical water shortage starts to affect people, individually and collectively. Or, in more abstract terms, most socioeconomic definitions of drought associate it with the supply and demand of an economic good.

Annual precipitation in Bottineau County ranges from 14-19 inches, the northwest corner averages around 14 and the Turtle Mountain area receives 17 to 19 inches of rain. About 75 percent of the annual precipitation occurs during the crop season from April to September. (North Dakota State Climate Office, 2013)

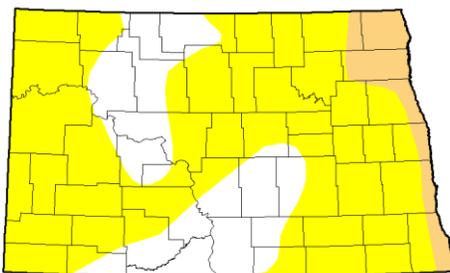
Weather forecasters cannot predict with certainty just when a drought will occur, but they do know that these drier than normal periods tend to alternate with wetter than normal periods. Droughts of the past can be read in the growth rings of trees. In wet periods, the ring is thicker than in dry periods. Precipitation deficits as little as four to six inches can cause severe drought conditions.

Drought severity regarding our agriculture procedures depends on time of year, timing of precipitation, amount of stored soil water, type of crop, stage of growth, and meteorological variables such as temperature, humidity, and wind.

The National Drought Mitigation Center monitors drought conditions throughout the United States. The current North Dakota map showing the Palmer Drought Index in March, 2015 is depicted below. It is showing Bottineau County currently as Abnormally Dry. This is an indication that in the last several months below average precipitation has fallen which may/may not result in drought conditions. However, the long range forecast issued no the National Weather Service is calling for average temperatures and precipitation for the 2015 growing season.

Drought Intensity Scale

As of May 12th, 2015



Intensity:



A number of secondary hazards are generally associated with drought. Rural grassland fires and forest fires increase because of dry vegetation. Reduction in vegetation cover will expose the soil to wind, and dust storms and soil erosion will occur. Because of reduction in surface water levels, the water quality of surface water can become stagnant affecting livestock and recreational use.

Deterioration in water quality, in turn, results in injury and death to plants and animals. Stagnant pools provide favorable habitats for insects, particularly mosquitoes which can carry West Nile disease.

Grasshoppers which consume large amounts of remaining vegetation thrive in drought conditions affecting crops, pastures, and hay land. Finally, with the return of the rains, the dry and unstable topsoil is vulnerable to gullying and flooding, and erosion.

There is a wide range of possible consequences that have occurred and can occur again in regard to drought.

Drought is a creeping phenomenon, pervasive in nature. The effects of drought slowly accumulate and tend to persist over long periods of time, in contrast to sudden and short-lived impacts of floods, winter storms, and tornadoes. The start and end of drought is difficult to determine. Often the question of whether or not an extended dry spell is, in fact, a drought causes considerable debate among meteorologists, farmers, public officials, and other agricultural experts.

The effects of drought directly impact economic and social stability of the area concerned. Losses do not usually include direct structural damage or traumatic loss of human life. The amount, duration, and extent of moisture deficiency necessary to establish a drought threshold vary considerably. For example, a certain lack of precipitation may cripple the livestock industry early on but not affect urban water systems until later.

The human population is affected by drought. Stress to farmers and their families that have dollars invested in a crop are evident during drought. This stress may lead to other social issues such as excessive consumption of alcohol or other drugs, marital issues, and the health issues caused by low quality water or limited water supplies and respiratory problems caused by blowing dust.

Several drought indices are used to measure a drought’s severity and any combination of these indices and others may be used to trigger a wide variety of response activities by governments, individuals, and organizations. **Table 4.3.1A** lists the more common indices and their use. Note that various response plans may address how these indices are used in response to a drought.

Table 4.3.1A Drought Indices

Index	Use
Percent of Normal	The percent of normal is a simple calculation well suited to the needs of television weathercasters and general audiences.
Standardized Precipitation Index (SPI)	The SPI is an index based on the probability of precipitation for any time scale.

Palmer Drought Severity Index (PDSI)	The Palmer is a soil moisture algorithm calibrated for relatively homogeneous regions.
Crop Moisture Index (CMI)	A Palmer derivative, the CMI reflects moisture supply in the short term across major crop-producing regions and is not intended to assess long-term droughts.
Surface Water Supply Index (SWSI)	The SWSI was originally designed to complement the Palmer in the State of Colorado, where mountain snowpack is a key element of water supply. The SWSI is calculated by river basin, based on snowpack, streamflow, precipitation, and reservoir storage. Other states have modified the SWSI for their areas.
Reclamation Drought Index (RDI)	Like the SWSI, the RDI is calculated at the river basin level, incorporating temperature as well as precipitation, snowpack, streamflow, and reservoir levels as input.
Deciles	Groups monthly precipitation occurrences into deciles so that, by definition, —much lower than normal weather cannot occur more often than 20% of the time

Source: National Drought Mitigation Center, 2014

Bottineau County and the surrounding area has the fortune of having significant aquifers which are subsurface sand/gravel layers that are unaffected by short term droughts because of their size and the volume of water they contain thus are able to provide a dependable water supply for the farmsteads and cities of the County. Cities and rural residents, mainly farmsteads, throughout the county receive their water from ground water as depicted in the following tables.

In the past, Bottineau County has seen drought impacts after long periods of below average precipitation. In 1991 and 1992, some cities began having to conserve water on a regular basis as local wells were beginning to dry up after a prolonged drought period. It was indicated during one of our planning meetings that water shortages could again affect the county’s water supplies after about four years of drought conditions.

Table 4.3.1B Water System and City Water Source

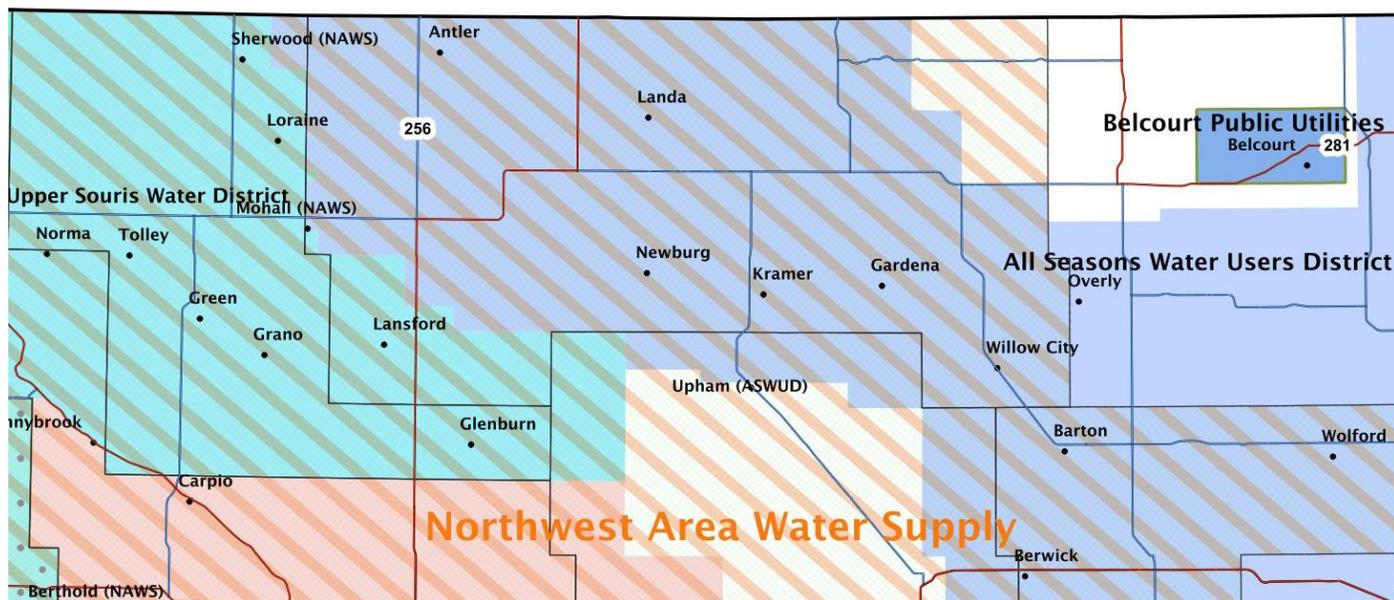
City	Water Source	Source
City of Antler	Ground Water	All Seasons Water Users District
City of Bottineau	Ground Water	Bottineau Municipal Water
City of Gardena	Ground Water	All Seasons Water Users District
City of Kramer	Ground Water	All Seasons Water Users District
City of Landa	Ground Water	All Seasons Water Users District
City of Lansford	Ground Water	Upper Souris Water District
City of Maxbass	Ground Water	Maxbass Water
City of Newburg	Ground Water	All Seasons Water Users District
City of Overly	Ground Water	All Seasons Water Users District
City of Souris	Ground Water	Souris Water

City of Westhope	Ground Water	Westhope Water
City of Willow City	Ground Water	All Seasons Water Users District

The three water districts that provide water services to Bottineau County also serve the rural areas of Bottineau County including all the townships and unincorporated cities in the county. Figure 4.3.1C shows the areas served by the three districts.

Figure 4.3.1C Bottineau Water Providers

The map depicts the boundary of the All Seasons Water Users District as well as the Upper Souris Water District which services Bottineau County of Lansford.



4.3.2 Geographic Location

Drought and infestations are usually regional hazards that are not enhanced by county-level mapping. All county areas are assumed to have the same risk level. Mapping of the current drought status is published by the US Drought Monitor each Thursday at <http://drought.gov>. North Dakota also has an extensive network of ground monitoring wells and surface water gauges. Ground water information, including hydrographs, recent water levels and chemistry conditions, can be found at <http://mapservice.swc.state.nd.us/>. Daily streamflow conditions are maintained by the US Geological Survey and can be found at <http://waterdata.usgs.gov/nd/nwis/rt>.

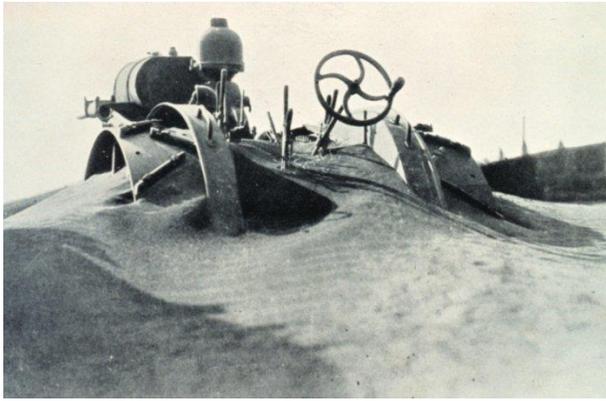


Figure 4.3.2A Dust buried farms and equipment, killed livestock, and caused human death and misery during the height of the Dust Bowl years. Source: National Weather Service, 1935.

4.3.3 Previous Occurrences

Paleoclimate studies show extreme periods of drought hundreds of years ago in the northern Great Plains including 200-370 A.D., 700-850 A.D., and 1000-1200 A.D. Compared to these periods over the past 2,000 years, the droughts since 1200 A.D. have been relatively wet and minor. (Laird et al, 1996) Droughts cannot be defined with certainty as extremely dry periods often alternate with wetter than normal periods.

1930s Dust Bowl: June 1929 was one of the driest on record in North Dakota, followed by continuing drought conditions throughout the 1930s. The “Dust Bowl,” as it is called, resulted in widespread drought conditions, soil erosion, and grasshopper infestations. This drought was

exacerbated by poor farming practices, low market prices, and a depressed economy. Lessons learned during the 1930s drought stimulated the creation of governmental agencies to promote conservation, increased irrigation, and education stressing more flexible and diverse operations using improved management practices. The Federal Crop Insurance Program was established and institutions liberalized credit. The United States Department of Agriculture (USDA), the North Dakota State Agricultural Experiment Station System, and agricultural colleges and universities began an intensified research effort. This resulted in technologies for control of soil erosion, soil moisture conservation, higher yielding grain varieties that could better withstand dry conditions, improved fertilizers, and better farm management techniques. (North Dakota Multi-Hazard Mitigation Plan, 2013)

1950s: The impact of drought in the early 1950s was less severe than the 1930s. The widespread financial distress, interstate migration, and regional disruption characteristic of the Dust Bowl era were largely absent. Strong emphasis was placed on water conservation and augmentation, weather modification research, weather prediction and control, groundwater recharge, irrigation and river basin development, evaporation control, desalination, phreatophyte control, and irrigation canal lining. (North Dakota Multi-Hazard Mitigation Plan, 2013)

1970s and 1980s: 1976 was the driest year in North Dakota since the 1930s according to the State Historical Society of North Dakota. By 1988, the North Dakota Governor declared a statewide emergency because of the drought. Damages were not limited to agricultural losses. Public water systems and individual wells also began to dry up. Disaster damage in 1988 was estimated to be \$3.5 billion, not including the cost of indirect impacts. In the 1970s and 1980s, response to drought by state and federal governments was characterized by provisions for livestock feed assistance, crop loss financial aid packages (deficiency and disaster payments), commodity stock adjustments, disaster credit and forbearance programs for agriculture producers and related small businesses, and some water-related assistance. (North Dakota Multi-Hazard Mitigation Plan, 2013)

2000-2007: North Dakota soils were under some degree of drought and ruled for 78 consecutive months from December 2000 until mid-June 2007. The most severe drought occurred during July 2006 when 100 percent of the State experienced at least moderate drought status on the drought monitor scale. The conditions strained public water supplies and directly affected hydropower production. In 2007, drought cost the livestock industry more than \$32 million. Grazing was reduced due to drought conditions, forcing producers to sell livestock as well as land. Also approximately 45,000 acres of grassland burned and 50 percent of counties were under burn bans throughout the summer.

During this time, the U.S. Bureau of Reclamation assisted several communities with low water levels. At Parshall, the State of North Dakota DRAFT 5.61 2014 Multi-Hazard Mitigation Plan paid for high service pumps, area pipelines and elevated water storage in 2005-2006. In Four Bears, White Shield and Twin Buttes, Reclamation raised and exposed the existing backup intake screens for their water treatment plants as well as rip rap installation/repair at the intakes for both high and low water lake conditions in 2005-2006. (North Dakota Multi-Hazard Mitigation Plan, 2013)

2012: Most locations across western and central North Dakota this year experienced it as one of the top ten warmest years on record, drier than normal conditions, and a snowfall deficit of over 10 inches. Several locations had their warmest March average temperature on record. The average temperatures in March were 12 to 14 degrees Fahrenheit above normal. The drought conditions deteriorated throughout the summer and fall, with below normal precipitation and abnormally dry conditions. In August and September, there were very high and extreme fire dangers in portions of southwest and south central North Dakota. The west to northwest wind gusts were reported between 45 to 51 mph on several days. The drought conditions improved during November and December as the weather pattern transitioned into wetter than normal conditions. (North Dakota Multi-Hazard Mitigation Plan, 2013)

The Federal Emergency Management Agency’s ability to utilize the President’s Disaster Fund for drought relief to state and local interests is very limited in scope; however the US Department of Agriculture frequently declares agricultural disasters because of drought.

Table 4.3.3A Bottineau County Drought Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
DR 3016	North Dakota	1976	Presidential Emergency Declaration; Driest year in North Dakota since 1936	None	Unknown
State EO	North Dakota	1980	State Declared Drought Disaster	Unknown	Unknown
State EO	North Dakota	1981	State Declared Drought Disaster	Unknown	Unknown
State Request	North Dakota	1990	Governor’s Request for USDA assistance for Adverse Weather/Drought	Unknown	Unknown
State EO	North Dakota	1993	State Declared Agricultural Emergency	Unknown	Unknown
State Request	North Dakota	2000	Governor’s Request for USDA assistance for Dry and Flood Conditions	Unknown	Unknown

Declaration	Location	Date	Magnitude	Casualties	Damages
State Request	North Dakota	2002	Governor’s Request for USDA assistance for Drought	Unknown	Unknown
State EO	North Dakota	2002	State Declared Drought Disaster	Unknown	Unknown
State EO	North Dakota	2003	State Declared Drought Emergency	Unknown	Unknown
State EO	North Dakota	2004	State Declared Agricultural Emergency/Drought Disaster	Unknown	Unknown
State EO	North Dakota	2005	State Declared Drought Disaster/Fire Danger Emergency	Unknown	Unknown
USDA S2388	Entire State of North Dakota	January 1, 2006 through December 31, 2006	Also included impacts from hail, high winds, excessive heat, winter storms, and excessive moisture.	None	Unknown
State EO 2006-05.1	North Dakota	7/12/2006	State declared agricultural drought emergency	Unknown	Unknown
USDA Secretarial	Entire State of North Dakota	January 1, 2007 through December 31, 2007	Also included impacts from frost, high temperatures, overland flooding, torrential rainfall, severe storms, hail, and high winds.	None	Unknown
USDA Secretarial	Entire State of North Dakota	January 1, 2008 through December 31, 2008	Also included impacts from frost, general lack of timely precipitation, high temperatures, insect and disease pressure, heavy rainfall, overland flooding, hail, and high winds.	None	Unknown
State EO 2008-02	North Dakota	5/8/2008	State declared early-phase agricultural drought emergency	Unknown	Unknown
USDA S2942	42 counties in Central and Eastern North Dakota	January 1, 2009 through July 26, 2010	Also includes impacts from frost, cool temperatures, excessive rain, excessive late-season snowfall, flooding, ground saturation, hail, high winds, and weather related losses from insects and diseases.	None	Unknown
USDA S3405	Benson, Billings, Cavalier, Dunn, Eddy, Bottineau, Golden Valley, Griggs, McKenzie, Nelson, Pierce, Ramsey, Slope, Stark, Towner, Walsh, Wells Counties	July 24, 2012 through September 24, 2012	Also includes impacts from high winds, fire, excessive heat, and insects.	Unknown	Unknown
State EO 2012-08	North Dakota	8/14/2012	State declared early-phase agricultural drought emergency	Unknown	Unknown

Source: North Dakota Multi-Hazard Mitigation Plan, 2013

Insured Crop Loss Data

Bottineau County has annualized crop losses of \$1,675,984 due to drought during the period 2003-2012. During this period, drought related crop insurance paid \$14,916,262 in insurance claims. (North Dakota State Hazard Mitigation Plan, 2014).

4.3.4 Probability and Magnitude

Figure 4.3.4A is a graphical representation of the range of events that can occur within the drought hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the drought hazard. The impact categories are defined at the beginning of this chapter.

Table 4.3.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				Statewide Loss of Potable Water
	<i>No local history</i>				
	<i>100 years</i>			Loss of Public Water Supplies	
	<i>50 years</i>		High Water Users Impacted		
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

The National Oceanic and Atmospheric Administration Paleoclimatology Program studies drought by analyzing records from tree rings, lake and dune sediments, archaeological remains, historical documents, and other environmental indicators to obtain a broader picture of the frequency of droughts in the United States. According to their research, "...paleoclimatic data suggest that droughts as severe as the 1950s drought have occurred in central North America several times a century over the past 300-400 years, and thus we should expect (and plan for) similar droughts in the future. The paleoclimatic record also indicates that droughts of a much greater duration than any in the 20th century have occurred in parts of North America as recently as 500 years ago." Based on this research, the 1950s drought situation could be expected approximately once every 50 years or a 20% chance every ten years. An extreme drought, worse than the 1930s "Dust Bowl," has an approximate probability of occurring once every 500 years or a 2% chance of occurring each decade. (National Oceanic and Atmospheric Administration, 2003)

A 500-year drought with a magnitude similar to that of the 1930s that destroys the agricultural economy is an example of a high magnitude event. Coupled with an insect infestation, the drought problems would cause serious economic and possibly health problems in Bottineau County.

4.3.5 Risk Assessment

Vulnerability Overview

Typically, the most profound impact of drought is to the economy. Important sectors of the Bottineau County economy that can experience impacts from drought include agriculture, food processing, and tourism/recreation. Reduced precipitation or low irrigation supplies may damage crops and reduce the amount of feed available for livestock. Non-irrigated croplands and rangelands are most susceptible to moisture shortages. Irrigated agricultural lands do not feel the effects as quickly, but their yields can also be greatly reduced, particularly if irrigation supplies are rationed. With an agricultural market value of \$241,696,000 drought can severely diminish profits for the roughly 863 farms and ranches in Bottineau County. Over the past 10 years, insured crop losses in Bottineau County due to drought have averaged over \$1,491,626 annually.

To determine the overall vulnerability of the impacts of drought to agricultural areas in Bottineau County, an analysis was completed based on crop and livestock exposure, as well as the crop loss data based on crop insurance payments. The drought-related crop insurance payments have been extrapolated to estimate damages to insurable crops that are not insured. This is based on the percent of insurable crops that are covered by crop insurance. According to the 2013 North Dakota Crop Insurance Profile Report issued by the USDA Risk Management Agency 93 percent of North Dakota’s crops were insured in 2013. The crop exposure value from the 2012 Census of Agriculture is provided as the basis for a ratio of annualized losses to crop exposure. The overall vulnerability is based on the estimated crop damage ratio.

Table 4.3.5A Bottineau County Drought Agricultural Vulnerability Analysis

Crop Exposure Value (2007 Census of Agriculture)	Drought-Related Crop Insurance Paid (2003-2012)	Estimated Crop Damages (extrapolated based on 93 percent insured)	Annualized Estimated Crop Damages	Estimated Crop Damage Ratio	Overall Vulnerability
\$158,991,000	\$14,916,262	\$16,759,845	\$1,675,984	0.0105	Moderate-High

Source: USDA Risk Management Agency; 2012 USDA Census of Agriculture

Loss Estimates

Table 4.3.5A in the preceding Vulnerability section provides the annualized estimated crop losses for Bottineau County. Similar annual losses can be expected if drought conditions are similar to the pattern in this 10-year time period. However, as discussed in the previous events section, there is a natural cycle of wet conditions followed by dry conditions. Additionally, the magnitude of dry periods can vary. So, this analysis is limited in determining accurate future loss estimates due to the many variables involved.

The impacts of drought are so diffuse and far-reaching that financial estimates of loss are often difficult to quantify. **Table 4.3.5B** shows the types of losses that may occur with drought.

Table 4.3.5B Categories of Potential Drought Losses

Drought Type/Severity	Loss Type	Causes
Agricultural	Costs and losses to agricultural producers	<ul style="list-style-type: none"> - Annual and perennial crop losses - Damage to crop quality - Reduced crop yields - Reduced productivity (wind erosion, loss of organic matter) - Insect infestation - Plant disease - Wildlife damage to crops - Increased irrigation costs - Water resource development (wells, dams, pipelines)
Agricultural	Costs and losses to livestock producers	<ul style="list-style-type: none"> - Reduced productivity of rangeland - Reduced milk production - Forced reduction of foundation stock - Closure/limitation of public lands to grazing - High cost/unavailability of water/feed for livestock - Water resource development (wells, dams, pipelines) - Increased feed transportation costs - High livestock mortality rates - Disruption of reproduction cycles - Decreased stock weights - Increased predation - Range fires
Agricultural	Loss from timber production	<ul style="list-style-type: none"> - Wildland fires - Tree disease - Insect infestation - Impaired productivity of forest land - Direct loss of tress, especially young ones
Agricultural	General economic effects	<ul style="list-style-type: none"> - Decreased land prices - Loss to industries directly dependent on agricultural production (machinery, fertilizer, food processors, dairies) - Unemployment from declines in production - Strain on financial institutions (foreclosures, more credit risk, capital shortfalls) - Revenue losses to government (reduced tax base) - Reduction of economic development - Fewer agricultural producers (due to bankruptcies, new occupations) - Rural population loss
Hydrological	Loss from fish production	<ul style="list-style-type: none"> - Damage to fish habitat - Loss of fish and other aquatic organisms due to decreased flows
Hydrological	Loss to recreation and tourism industry	<ul style="list-style-type: none"> - Loss to manufacturers and sellers of recreational equipment - Losses related to curtailed activities: hunting, fishing, bird watching, boating
Hydrological	Damage to animal species	<ul style="list-style-type: none"> - Reduction and degradation of fish and wildlife habitat - Lack of feed and drinking water - Greater mortality (increased contact with producers) - Disease

Drought Type/Severity	Loss Type	Causes
		<ul style="list-style-type: none"> - Increased predations - Migration and concentration - Increased stress to endangered species - Loss of biodiversity
Hydrological	Hydrological effects	<ul style="list-style-type: none"> - Lower water levels in reservoirs, lakes, and ponds - Reduced flow from springs - Reduced streamflow - Loss of wetlands - Increased groundwater depletion, land subsidence, reduced recharge - Water quality effects (salt concentration, increased water temperature, pH, dissolved oxygen, turbidity)
Socioeconomic	Water suppliers	<ul style="list-style-type: none"> - Revenue shortfalls and/or windfall profits - Cost of water transport or transfer - Water resource development (wells, dams, pipelines)
Socioeconomic	Decline in food production/disrupted food supply	<ul style="list-style-type: none"> - Increase in food prices - Increased importation of food (higher costs)
Socioeconomic	Damage to plant communities	<ul style="list-style-type: none"> - Loss of biodiversity - Loss of trees from urban landscapes, shelterbelts, wooded conservation areas
Socioeconomic	Health and values	<ul style="list-style-type: none"> - Mental and physical stress - Low-flow problems - Reductions in nutrition - Loss of human life (heat stress, suicides) - Public safety from forest and range fires - Increased respiratory ailments - Increased disease caused by wildlife concentrations - Increased conflicts (water use, political, management) - Increased poverty in general - Population migrations - Loss of aesthetic values - Reduction or modification of recreational activities - Disruption of cultural belief systems - Reevaluation of social values - Dissatisfaction with government response - Perceptions of inequity in relief - Loss of cultural sites - Increased data/informational needs - Recognition of institutional restraints on water use

Source: National Drought Mitigation Center

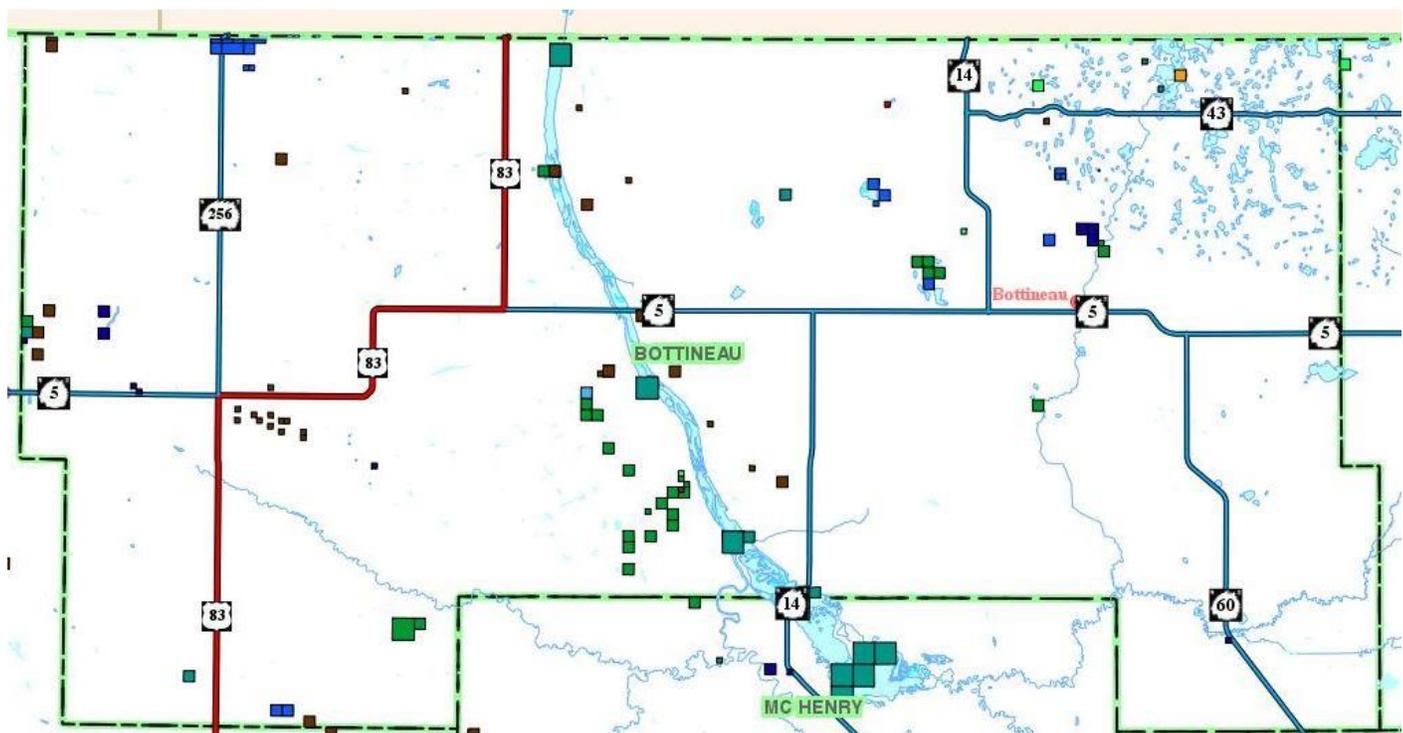
4.3.6 Critical Facilities in Hazard Prone Areas

Generally, facilities/buildings themselves are not physically threatened by drought. However, critical infrastructure, particularly those systems that rely on water for operations, can be negatively affected by drought. If public water supplies are lost, this would in turn negatively impact the function of state government services. Surface water bodies in Bottineau County do not have water supply intakes for municipal, industrial, and irrigation purposes, these water sources are from ground water. However,

livestock water sources on range/pasture land often rely on surface water. Low water levels can cause operations to cease and damages to livestock production can occur. Figure 4.3.6A is a countywide map of location and type of active water permits.

In addition to the importance of surface water supplies, ground water supplies can also be affected by drought, diminishing the water available from wells. Shallow wells may even dry up. Should a public water or sewer system be affected, the losses could be into the millions of dollars if equipment is damaged and outside water is shipped in. Individuals with residential wells may also be impacted. Individual ground water users may have additional information regarding the vulnerabilities of their specific ground water systems. The levels at which specific areas begin to experience ground water impacts depend on the local ground soil and water conditions and the depth of the well. Figure 4.3.6A 'Active Water Permits' shows water wells that are used for irrigation, water user district wells, and agricultural purposes.

Figure 4.3.6A Active Water Permits



Source: ND State Water Commission Mapservice, 2015

4.3.7 Development in Identified Hazard Areas

Future development's greatest impact on the drought hazard would possibly be to ground water resources. New water and sewer systems or significant well and septic sites could use up more of the water available, particularly during periods of drought. Fortunately, public water systems are monitored by the North Dakota Department of Health, but individual wells and septic systems are not as strictly regulated. Therefore, future development could have an impact on the drought vulnerabilities.

4.3.8 Data Limitations and Other Key Documents

The data limitations related to the drought hazard include:

- Difficulties in pinpointing the start and end of drought periods
- Limitation in quantifying economic losses from drought and infestations
- Lack of a publicly available database listing historical USDA drought declarations and the associated losses

Other key documents include:

- Climatic and Hydrologic Aspects of the 1988-1992 Drought and the Effect on People and Resources of North Dakota, North Dakota State Water Commission, 1994.
- North Dakota Drought Response Plan
- North Dakota Emergency Operations Plan, Drought Overview and Checklist

4.4 Flood

Including Riverine, Closed Basin, Ice Jam, and Flash Floods

Frequency	Very Likely	Nearly 100% probability in the next year
Impact	Minor	1-10% of the jurisdiction affected
Risk Class	3	Moderate Risk Requires fast action Address via Mitigation and Contingency Plans
Seasonal Pattern	Early March to late April, throughout summer for flash flood	
Duration	1-2 Weeks	
Speed of Onset	Hours if flash flooding, days is seasonal spring flooding	

4.4.1 Description

Flooding needs special attention in the Bottineau County Multi-Hazard Mitigation Plan because it has caused the most hardship in the disruption of people’s lives and the most financial losses for individuals, businesses, and governments. Flooding is Bottineau County’s most costly and repetitive natural hazard as evidenced by the number of flood disasters experienced in Bottineau County. Bottineau County has a moderate risk rating for flooding. The most recent flooding disaster declaration was in July 2014 with an estimated \$2,150,837.58 obligated by FEMA.

<https://www.fema.gov/disaster/4190#tabs-2>

Floods can occur when the ground is frozen and/or saturated with moisture and cannot absorb any further moisture. This moisture can come from several different sources and circumstances. One source is heavy snow pack which is affected by a rapid warming trend as well as spring rain falling directly on the snow pack. Another source of flooding occurs when heavy rain falls in such a short time that the soil cannot absorb it. Flooding is also caused when heavy rain falls over a prolonged period of time, and the ground becomes saturated and cannot absorb the additional moisture. Flooding in Bottineau County can be the result of culverts plugging by ice or debris or by excessive water exceeding culvert capacity. A plugged culvert causes the roads to act as a dam resulting in the water backing up behind the road. Road damages can occur if the water overtops the road causing gravel wash, a road washout or a culvert washout.

Rural areas are more subject to flooding because the lakes and sloughs fill with water and flow into each other causing road damage. In Bottineau County, flooding occurs because excess water from the Turtle Mountains flows downhill, onto the drift prairie. The Turtle Mountain elevation is about 800 feet above the surrounding drift prairie, causing rapid flow downhill, and a slower flow as the water hits the flatter plain. Through the years Bottineau County has successfully mitigated numerous rural road flood incidents through grade raises as part of disaster recovery efforts. As flood caused road washouts were repaired, the road grade was raised to prevent water from going over the road and washing it out. The Hazard Mitigation Planning Committee carefully studied post disaster mitigation

actions that were completed and concluded the rural road flooding situation needs to be continually monitored.

The Bottineau County cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City are not immune to flooding but have successfully mitigated flooding through proper drainage, limiting structure locations to being built out of the flood plain, or the cities are built on topography that is higher than the surrounding landscape.

Types of Flooding

Several different types of flooding occur in Bottineau County; they include Riverine Flooding, Closed Basin Flooding, Ice Jam Flooding, Flash Flooding, and Groundwater Flooding. The spring flood danger period is generally from March through May. The magnitude of the flooding varies from year to year depending on such factors as characteristics of the snow cover, soil moisture conditions, frost depth, winter temperatures, temperatures during spring melting, spring precipitation, and the extent of ice jams. A wet fall, early freeze up with saturated ground at the time of freezing, heavy winter precipitation, and warm rains during and after spring thaw add to the seriousness of the spring flooding situation.

Riverine Flooding

Riverine flooding originates from a body of water, typically a river, creek, or stream, as water levels rise onto normally dry land. Bottineau County has a low-moderate risk for riverine flooding. To provide additional details on the populations and assets vulnerable to riverine flooding, a GIS-based analysis was completed utilizing Q3 data. As discussed previously, a **DFIRM (Digital Flood Insurance Rate Map)** is a digital version of the FIRM that is designed for use with digital mapping and analysis software. A preliminary DFIRM is the DFIRM product that is not yet effective and in force. Prior to becoming effective some modifications could be made to a preliminary DFIRM. Digital Q3 flood data are developed by scanning the existing FIRM hardcopy, vectoring a thematic overlay of flood risks. Vector Q3 flood files contain only certain features from the existing FIRM hard copy and are not as accurate as DFIRM data. However, in the absence of a DFIRM, the Q3 data is the best available data for GIS-based analysis. Bottineau County has Q3 data available. A vulnerability analysis was completed to determine populations and assets at risk utilizing the census block data available as part of FEMA's HAZUS MH 2.1. Bottineau County has 198 people, 135 buildings with a building value of \$21,929,000, and an estimated content value of \$10,964,500 bringing the total value to \$32,893,500. The locations of the 198 affected structures can be found in the DFIRM Maps in Appendix E. The DFIRM Maps show the vulnerability to flooding in Willow City and Souris. Since 2000, Bottineau County has had eight flood events with damage estimates totaling \$1,297,000. Source: FEMA DFIRM, Preliminary DFIRM, and Q3 Data; HAZUS MH 2.1

Beaver Dams

Throughout the year, Beavers wreak havoc on local streams and rivulets, particularly in the Turtle Mountain Region of the county. Beavers will dam up these streams, causing them to slow the flow and back up behind the dams, sometimes halting the water all together causing flooding upstream. Beavers are not a huge flooding risk, but nevertheless are noted for planning purposes.

Ice Jams

Flooding can also result from ice jamming or blockage along drainage areas blocking culverts or drainage channels. Ice breaking up into pieces, called floes, moves along with the flowing water bunching up developing a dam like structure. Bottineau County can have ice jams developing as water moves from tributary to another, or on mainstream rivers as temperatures become warmer in the spring months.

Flash Flood

Another source of flooding, called flash flooding, occurs when heavy rain falls in such a short time that the soil cannot absorb it and/or drainage systems (natural or man-made) cannot carry the volume of water away as quickly as it accumulates. Flash flooding also occurs when heavy rain falls over a prolonged period of time and the ground becomes saturated and cannot absorb the additional moisture fast enough. In Bottineau County a flash flood is usually caused by severe thunderstorms, heavy rains on snowpack, or slow moving storms. Flash floods can occur anywhere when a large volume of water inundates an area over a short time period. Because of the localized nature of flash floods and variables in rainfall amounts and duration, clearly defined areas prone to flash flooding are difficult to identify. These types of floods often occur rapidly with significant impacts. Rapidly moving water, only a few inches deep, can lift people off their feet, and only a depth of a foot or two, is needed to sweep cars away. Most flood deaths result from flash floods. Since the year 2000, Bottineau County has experienced 4 flash flood events causing \$759,000 worth of damage. Source: National Climatic Data Center, data downloaded on 3/27/2015.

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

Groundwater Flooding

Groundwater levels fluctuate from season to season and from year to year. Excessive groundwater may flood basements and crawlspaces but never reach the Earth’s surface. Basement flooding can cause extensive damage to homes and businesses. Often this type of flooding occurs during or following lengthy periods of heavy rainfall or melting of a heavy snowpack. All of Bottineau County is subject to ground water flooding. Numerous rural areas within Bottineau County have high water tables which cause ground water flooding.

Table 4.4.1.1 Bottineau County Flood Occurrences

Flood Type	History	Recurrence	Typical Impacts
Riverine/Overland Flooding	8 flood events in 14 years (2000 to 2014)	Averages about 1 event every couple years	Roads Bridges Sewer Systems Homes Businesses Public Facilities Electricity Agriculture
Flash Flood	4 events listed in 14 years	Averages only one every 3 years	Roads Homes

			Businesses Agriculture
Ice Jam	Do occur but are rare events.	No data available	Roads Homes Businesses Agriculture

<http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=38%2CNORTH+DAKOTA>

4.4.2 Geographic Location

Bottineau County Major Drainage Basins

Bottineau County is located entirely in the Souris River Watershed. However; Bottineau County is characterized by a combination of glaciated landforms and lake plains represented by lakes and small wetlands, particularly in the Turtle Mountain region in the northeast portion of the county. These lakes and potholes are natural landscape features that are internally drained but can provide ample wetland storage under a range of conditions. An exception to this exists in the case of extreme wet periods when the maximum storage capacity of prairie pothole complexes is reached and potholes and lakes flow into each other and eventually into Oak Creek/Souris River.

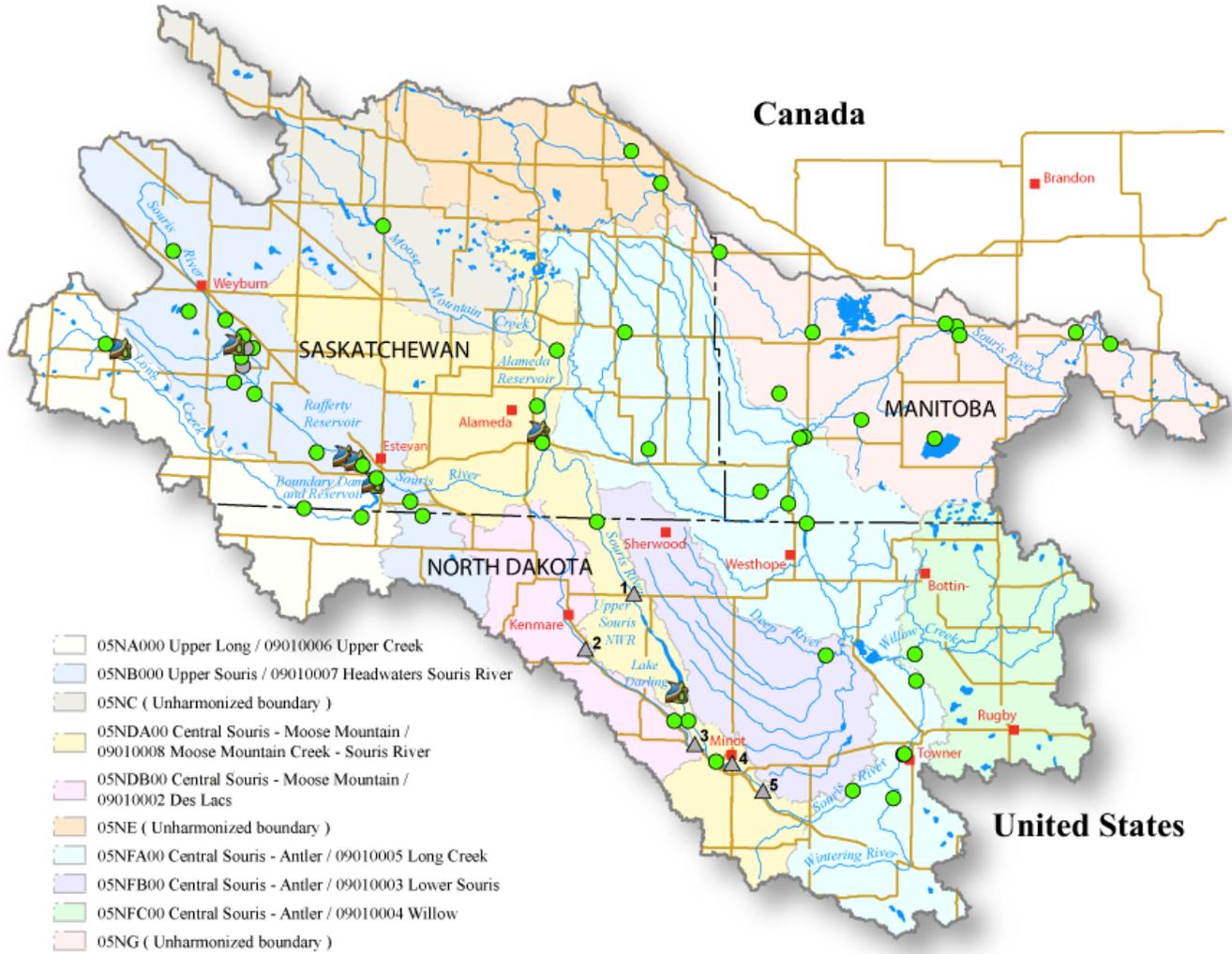
The Souris River, known as the ‘Mouse’ River on the US side, is the main drainage stem for the Souris River Watershed. The Souris River stretches 435 miles and drains a 23,600 square mile land area in southeast Saskatchewan, north central North Dakota, and southern Manitoba area. The Souris is controlled by two dams in Saskatchewan and Lake Darling in North Dakota, before heading through Minot, ND and through Bottineau County before swooping back northward into Canada again. The river drains into the Assiniboine River in Manitoba which dumps into the Red River in Winnipeg before emptying into Lake Winnipeg in Canada.

Figure 4.4.2A Stream Gages in the Souris River Basin in U.S. and Canada

(The map below the listing of the stream gages shows the stream gage locations.)

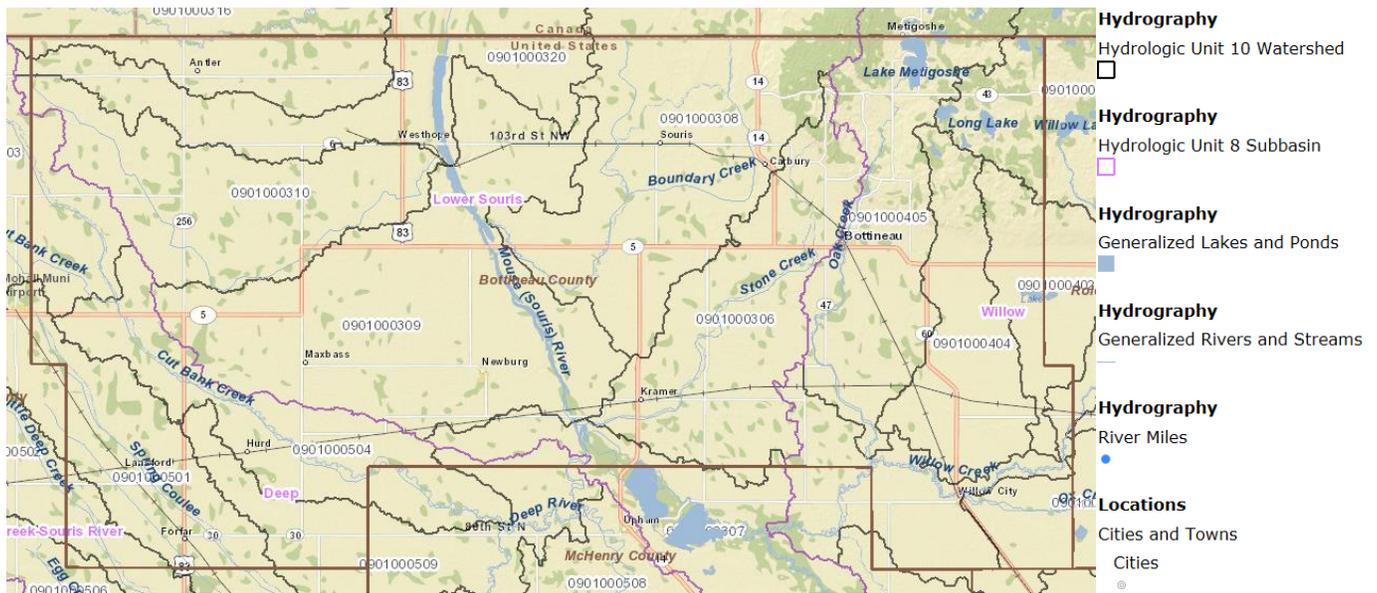
1.0 SOURIS RIVER BASIN

05NA003 LONG CREEK AT WESTERN CROSSING OF INTERNATIONAL BOUNDARY [SK]	05NF010 ANTLER RIVER NEAR WAUCHOPE [SK]
05NA005 GIBSON CREEK NEAR RADVILLE[SK]	05NG001 SOURIS RIVER AT WAWANESA [MB]
05NA006 LARSEN RESERVOIR NEAR RADVILLE[SK]	05NG003 PIPESTONE CREEK NEAR PIPESTONE [MB]
05NB001 LONG CREEK NEAR ESTEVAN [SK]	05NG007 PLUM CREEK NEAR SOURIS [MB]
05NB011 YELLOW GRASS DITCH NEAR YELLOW GRASS [SK]	05NG010 OAK CREEK NEAR STOCKTON [MD]
05NB012 BOUNDARY RESERVOIR NEAR ESTEVAN [SK]	05NG012 ELGIN CREEK NEAR SOURIS [MB]
05NB014 JEWEL CREEK NEAR GOODWATER [SK]	05NG020 MEDORA CREEK NEAR NAPINKA [MB]
05NB016 ROUGHBARK RESERVOIR NEAR WEYBURN [SK]	05NG021 SOURIS RIVER AT SOURIS [MB]
05NB017 SOURIS RIVER NEAR HALBRITE [SK] *NOT ACTIVE*	05NG023 WHITEWATER LAKE [MB]
05NB018 TATAGWA LAKE DRAIN NEAR WEYBURN [SK]	05NG024 PIPESTONE CREEK NEAR SASKATCHEWAN BOUNDARY [MB]
05NB020 NICKLE LAKE NEAR WEYBURN [SK]	05113600 LONG CREEK NEAR NOONAN, ND
05NB021 SHORT CREEK NEAR ROCHE PERCEE [SK]	05113750 EAST BRANCH SHORT CREEK RES NEAR COLUMBUS, ND
05NB033 MOSELEY CREEK NEAR HALBRITE [SK]	05114000 SOURIS RIVER NEAR SHERWOOD, ND
05NB034 ROUGHBARK CREEK NEAR GOODWATER [SK] *NOT ACTIVE*	05115500 05115500 LAKE DARLING NEAR FOXHOLM, ND
05NB035 COOKE CREEK NEAR GOODWATER [SK]	05116000 SOURIS RIVER NEAR FOXHOLM, ND
05NB036 SOURIS RIVER BELOW RAFFERTY RESERVOIR [SK]	05116500 DES LACS RIVER AT FOXHOLM, ND
05NB038 BOUNDARY RESERVOIR DIVERSION CANAL NEAR ESTEVAN [SK]	05117500 SOURIS RIVER ABOVE MINOT, ND
05NB039 TRIBUTARY NEAR OUTRAM [SK]	05120000 SOURIS RIVER NEAR VERENDRYE, ND
05NB040 SOURIS RIVER NEAR RALPH [SK]	05120500 WINTERING RIVER NEAR KARLSRUHE, ND
05NB041 ROUGHBARK CREEK ABOVE RAFFERTY RESERVOIR [SK]	05121000 SOURIS RIVER WEST OUTFALL AT EATON DAM NEAR TOWNER
05NC002 MOOSE MOUNTAIN LAKE (RESERVOIR) NEAR CORNING [SK]	05121001 SOURIS RIVER EAST OUTFALL AT EATON DAM NEAR TOWNER
05ND004 MOOSE MOUNTAIN CREEK NEAR OXBOW [SK]	05122000 SOURIS RIVER NEAR BANTRY, ND
05ND010 MOOSE MOUNTAIN CREEK ABOVE ALAMEDA RESERVOIR [SK]	05123400 WILLOW CREEK NEAR WILLOW CITY, ND
05ND011 SHEPHERD CREEK NEAR ALAMEDA [SK]	05123510 DEEP RIVER NEAR UPHAM, ND
05NE002 MOOSOMIN LAKE NEAR MOOSOMIN [SK]	05124000 SOURIS RIVER NEAR WESTHOPE, ND
05NE003 PIPESTONE CREEK ABOVE MOOSOMIN RESERVOIR [SK]	
05NF001 SOURIS RIVER AT MELITA [MB]	
05NF002 ANTLER RIVER NEAR MELITA [MB]	
05NF006 LIGHTNING CREEK NEAR CARNDUFF [SK]	
05NF007 GAINSBOROUGH CREEK NEAR LYLETON [MB]	
05NF008 GRAHAM CREEK NEAR MELITA [MB]	



Source: <http://nd.water.usgs.gov/floodinfo/souris.html>

Figure 4.4.2B Souris River Sub-Basins



4.4.3 Flood Damages

As history has shown, essentially all jurisdictions in Bottineau County are at risk from flood damages. The damages can be to private property such as homes, businesses, and utility infrastructure, public property such as government owned facilities, roads, and infrastructure, and the economy through agricultural and business disruption losses. These losses can vary from flood to flood and city to city.

Any county, township, or state highway in Bottineau County is vulnerable to flood damage due to flooding that occurs in Bottineau County. Critical structures (sewer, water, pump stations) located in the Cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City may be affected by ground saturation and overland flooding in low lying areas.

Slow-onset floods usually have a fair amount of warning time and allow people to evacuate from the hazard areas. Flash floods may not have lengthy lead times. Heavy rains can quickly inundate areas not typically prone to flooding, roads can washout and become a hazard to vehicle occupants. All jurisdictions in Bottineau County are at risk from flood deaths even though none have occurred in recent years. According to the National Weather Service, an average of 93 people died each year from floods, based on the 30-year history from 1980-2009. According to state disaster reports, a total of 31 people have died from floods in North Dakota from 1993 to May 2013. (Source: North Dakota State Hazard Mitigation Plan, 2014)

Flooding regularly affects the agricultural areas of Bottineau County. Flooding may reduce profits and delay the beginning of the planting season. When an extreme flood event occurs over a wide area, the economy of the affected area could be seriously affected. Flood events can cut off customer

access to businesses as well as close businesses for repairs. The closure of key roadways and rail lines may additionally have an impact on commerce.

The potential for flooding damages is primarily located in, but not limited to, the cities of Bottineau, Newburg, Souris and Willow City. The following narratives describe the impact flooding has on these communities.

Bottineau

In the city of Bottineau, it is estimated the eastern third of the city is impacted by flooding. Critical facilities and infrastructure at risk to flood waters include the Bottineau Middle School, Bottineau High School, a day care center, Dakota College at Bottineau, Oak Manor (an age-restricted facilities containing vulnerable populations), and approximately 324 households. A DFIRM Map for the city of Bottineau can be found in Appendix E.

Newburg

Homes and structures on the south side of the city are impacted from flooding. In 2009, two homes were sandbagged to hold back flood waters. It is estimated that 12 homes, three businesses and the public school are at risk when flooding occurs.

Souris

The city of Souris is located in a closed basin. According to the Bottineau County Emergency Manager, an estimated 2/3 of the city was impacted by flooding in 2005. Mitigation work to redirect flooding was completed about five or six years ago. Approximately 54 households, an elevator, gas station and fire hall are impacted from flooding.

Willow City

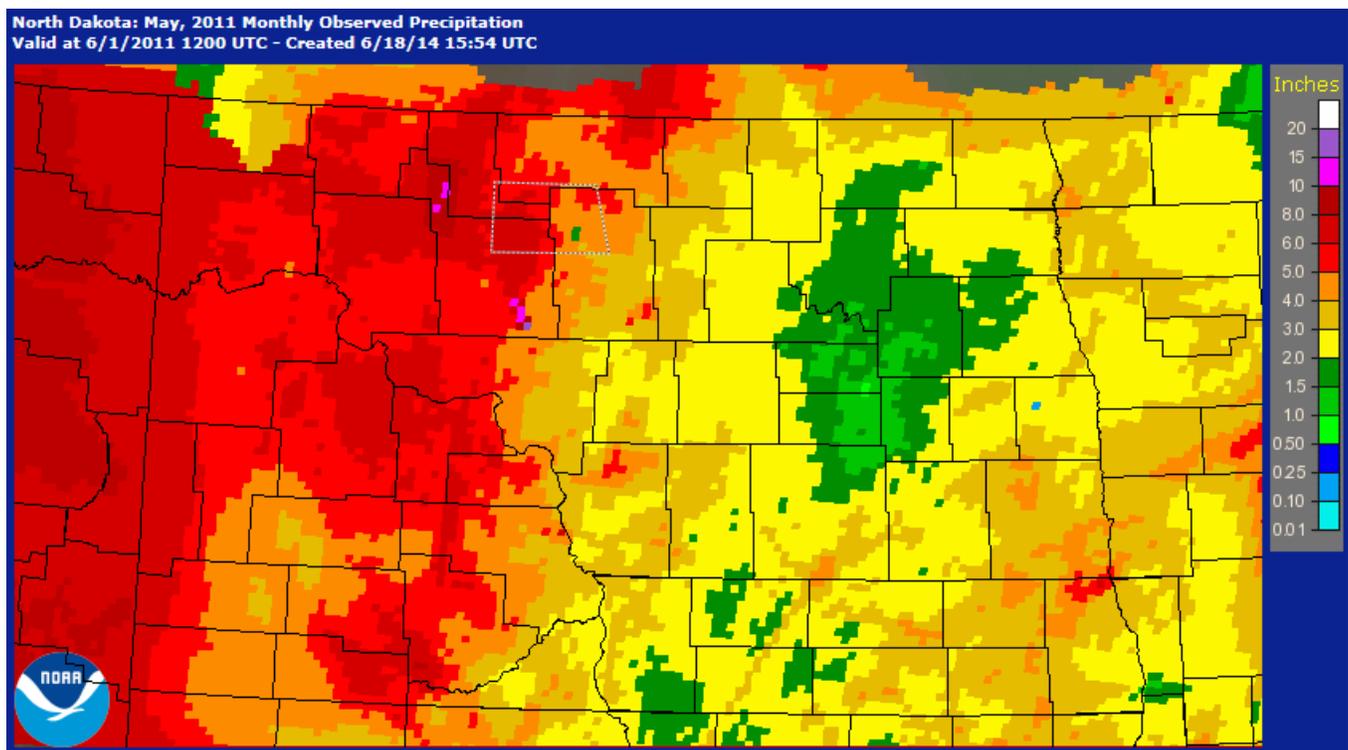
The city of Willow City is located on the Willow Creek, which experiences periodic flooding. However, according to the Bottineau County Emergency Manager, the path of the creek has been straightened out in the past and when flooding occurs, the city is not impacted. There is the potential for the N.D. Highway 60 bridge and neighboring railroad bridge to experience blockage. However, as of September, 2015, nothing has been reported.

It should be noted that the cities of Gardena, Kramer, Landa, Lansford, Maxbass and Westhope may be subjected to flooding, but the impact have been limited to full ditches and are within the capabilities of these jurisdictions.

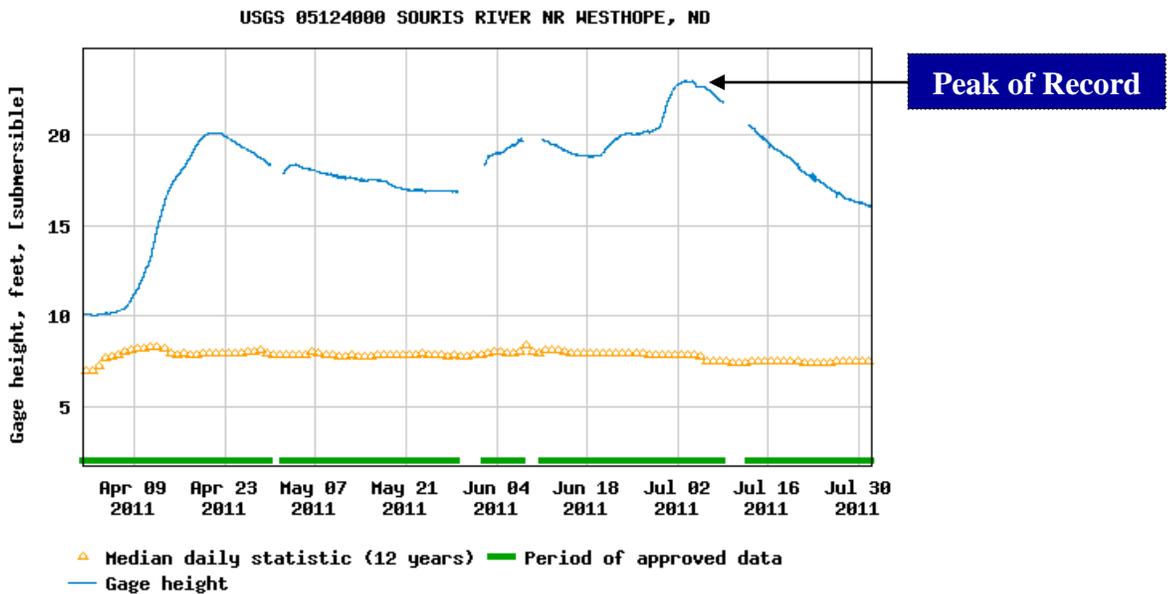
2011 Record Flood

The only major USGS gage in Bottineau County is located north of Westhope, ND on the Canadian border. In 2011, after a wet year in 2010 (the 7th straight year of above average precipitation), and heavy snows that winter into 2011, the foundation was ripe for major flooding in the Souris River Basin. The Souris River Drainage Basin received 150-300% of normal snowpack during the 2010-2011 winter season and 800% of normal precipitation fell during the melt cycle in early spring. During the peak of the spring runoff, several rainstorms hit the North Dakota, and Saskatchewan areas with 15-23” of rain in a period of two weeks (See Figure 4.4.3A below)

Figure 4.4.3A



This massive amount of water overwhelmed the two Canadian dams, and Lake Darling NW of Minot. The Army Corps of Engineers was forced to release record amounts of water at the rate of 24,000 Cubic Feet Per Second (cfs) by June 26th into the main stem Souris from Lake Darling. This worked its way through Minot and through Bottineau County by early July. The 2011 flood affected the cities of Antler, Kramer, Maxbass, and Willow City, along with the unincorporated communities of Omeme and Eckman. The total cost of the 2011 flood for Bottineau County was \$375,000.



Record Heights of Souris River in Bottineau County

Rank	Height	Date
1	22.95	7/03/2011
2	19.16	4/20/1976
3	17.34	4/22/1969
4	17.20	4/14/1999
5	16.90	4/18/1949

Flood Categories (in feet)	
Major Flood Stage:	16
Moderate Flood Stage:	14
Flood Stage:	10
Action Stage:	9

The 2011 flood shattered 21 peak records in North Dakota and forced the evacuation of 28 neighborhoods, including 12,000 residents of Minot alone.

Dirty floodwaters often contaminate or destroy everything they touch especially flood waters that may carry toxic chemicals, many of them agricultural chemicals. Road washouts often disrupt economic activities when farm to market roads are damaged. In addition social activities are cancelled and travel is limited plus it is costly to make road repair. Floods change the natural environment and hydrology of the affected area. High water can be beneficial to the natural processes within a floodplain and can benefit riparian areas filling the prairie potholes and lakes with water.

The sections that follow provide additional details regarding populations and values at risk to closed basin flooding. The many variables associated with flash flooding and ice jam flooding, preclude specific determinations of populations and values vulnerable to damage from these types of flooding events.

There have been 18 Presidential Disaster Declarations due to flooding in North Dakota since 1989. More recently, since 2009, Bottineau County has received five Presidential Declarations for public infrastructure flood damages, mainly road damages. The declarations and damages are depicted in table 4.4.3.1.

Table 4.4.3.1 Flood Public Infrastructure Damages

Disaster Number	Year	Number of Damaged Sites	Dollar Amount of Damages
DR 1829	2009	75	\$151,992
DR 1907	2010	20	\$132,339
DR 1981	2011	79	\$1,468,433
DR 4118	2013	3	\$116,107
DR 4128	2013	2	\$26,605

Source: ND Department of Emergency Services

Flood Property Losses

In 2009-2010 FEMA conducted a HAZUS (Hazards-US) Flood Average Annualized Loss (AAL) study which was performed for the entire continental United States using the MR4 release of HAZUS-MH. The inputs for the AAL included 30 meter Digital Elevation Model (DEM) and the default census block data in HAZUS MR4, which utilized the 2000 Decennial Census data.

The analysis was performed at the county level using Level 1 methodology with national datasets. The purpose of the AAL study was to identify flood-prone areas and communicate relative flood risk in terms of people and property vulnerable to damage. The AAL study data provides potential dollar losses for four flood frequencies as follows:

10-percent (10-year), 2-percent (50-year), 1-percent (100-year), and 0.2 percent (500- year). The average annualized loss estimates are then calculated based on the aggregated dollar losses from the various flood frequencies (averaged and annualized).

Total losses for Bottineau County are estimated to be \$414,000 based on this study. Bottineau County has a low loss rating as depicted by the table below.

Table 4.4.3.2 Bottineau County Losses

Business Disruption	Residential		Commercial		Other		Total		Total Losses	Loss Rating
	Buildings	Contents	Buildings	Contents	Buildings	Contents	Buildings	Contents		
(\$)	Loss	Loss	Loss	Loss	Loss	Loss	Loss	Loss	Losses	
\$8,000	\$174,000	\$87,000	\$22,000	\$70,000	\$10,000	\$43,000	\$206,000	\$200,000	\$414,000	Low-Moderate

Source: FEMA Average Annualized Loss Summary

Flood Crop Losses

An analysis based on crop insurance payments to insured crops for flood damages is available for Bottineau County over the 10-year period from 2003 to 2012. The USDA does not differentiate

damages resulting from various types of flood. So, these losses include combined losses for all types of flooding. According to the 2011 North Dakota Crop Insurance Profile Report issued by the USDA Risk management Agency, 89 percent of North Dakota insurable crops were insured in 2011. Therefore, the crop insurance payments have been extrapolated to estimate losses to all insurable crops. The crop exposure value from the 2007 Census of Agriculture is provided to provide the basis for an annualized ratio of estimated losses to total value.

Table 4.4.3.3 Flood-Related Crop Insurance Payments Analysis (2003-2012)

Value of Crops- 2012 Census of Agriculture	Crop Insurance Paid 2003-2012	Annualized Crop Insurance paid	Annualized Estimated Crop Losses	Crop Loss Ratio (Annualized Estimated Crop Losses/Value of Crops
\$241,696,000	\$144,720,926	\$14,472,092.60	\$20,544,160	8.5%

Source: USDA Risk Management Agency, 2014

The analysis of flood damage reduction needs and alternative corrective measures recognizes the nature of the areas subject to flooding, number of people affected, present and projected annual flood damages, probabilities of flooding, and the duration and depth of flooding. Both structural and nonstructural approaches for reducing or preventing flood damages require evaluation.

Structural measures are considered essential to the economic and social well-being of those urban areas where existing damages are high, the floodplain has been intensively developed, and many people are affected by recurring floods. Structural measures are assumed to be designed to provide protection for urban areas against floods having a one- percent chance of being exceeded during any single year (100-year flood). The regulation of floodplain land use and development in areas subject to urban growth is viewed as an integral element in any overall urban flood damage reduction program.

A variety of measures, including channel modification such as developing drains to remove water from low lying areas to include culvert installation to properly drain and distribute flood water are considered appropriate elements for reducing flood damages. The installation of home drainage systems with a sump pump can effectively reduce the water table around a home and eliminate or reduce basement flooding.

Structural/nonstructural measures for rural flood damage reductions are assumed to be designed to provide protection against floods having a ten-percent chance of being equaled or exceeded during a single year. A much higher degree of protection for rural areas is usually not economically feasible.

4.4.4 National Flood Insurance Program

The Federal Disaster Protection Act of 1973 requires state and local government to participate in the National Flood Insurance Program (NFIP) as a condition to the receipt of any federal loan or grant for construction projects in flood prone areas. The National Flood Insurance Program offers flood insurance to homeowners and businesses. This flood insurance is only available if either the

community does not have an identified flood hazard, or if the community adopts and enforces standards for construction in the identified flood hazard areas. Participation in the NFIP requires communities to adopt floodplain regulations that meet NFIP objectives, which are: New buildings must be protected from flooding damages that occur as a result of the 100-year flood, and new development must not cause an increase in flood damages to other property. There are no identified buildings in the county in a mapped flood plain and there are no future plans for construction of buildings in any mapped areas. Flood Plain management is being enforced by the county floodplain manager and will be conducted on a continued basis. Floodplain ordinances will be evaluated for each community listed in Table 4.4.4.1 by the floodplain manager at the same frequency.

Table 4.4.4.1 Communities in Bottineau County Participating in the NFIP

Jurisdiction	CID#	Entry Date	Mapped
City of Bottineau	380007	12/28/1973	9/02/2009
Township of Blaine	380674	2/04/1987	All Zone D
Township of Haram	380673	1/02/1987	All Zone D
City of Lansford	380184	2/14/1975	9/02/2009
City of Souris	380114	11/29/1974	9/02/2009
City of Willow City	380011	11/15/1974	9/02/2009
Township of Lansford	380675	8/19/1987	9/02/2009

Bottineau County has entered into the FEMA flood protection program. Local residents indicated that flooding has been a consistent problem, yet rarely has any significant impacts. Bottineau County has 6 flood insurance policies with \$712,000 of coverage. Since 1978 there have been just 2 flood insurance claims paying out \$0. (Source: North Dakota State Hazard Mitigation Plan, 2014; Pg. 5.126)

Bottineau County had three repetitive loss properties that have been resolved. One was bought out; the other two were moved out of the flood plain. There are no repetitive loss properties in Bottineau County as of 2015.

4.4.5 Probability and Magnitude

Table 4.4.5.1 is a graphical representation of the range of events that can occur within the flood hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the flood hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.4.5.1 Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				
	<i>No local history</i>				Event Similar to
	<i>100 years</i>				1997 Flood
	<i>50 years</i>	Waterways	Flood with Some	Flood Impacting	

<i>Annually</i>	Reaching Bankful	Road Damages	Communities	
	<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
	Impact			

Considering the extensive history of flooding in Bottineau County, this history will be used to express the probability and magnitude of floods in the state.

4.4.6 Risk Assessment

Vulnerability Overview

As history has shown, Bottineau County is especially at risk from flood damages. The damages can be to private property such as homes, businesses, and utility infrastructure, public property such as government owned facilities, roads, and infrastructure, and the economy through agricultural and business disruption losses.

Slow-rising riverine floods usually have a fair amount of warning time and allow people to evacuate from the hazard areas. Flash floods and ice jam floods may not have lengthy lead times. Heavy rains can quickly inundate areas not typically prone to flooding, roads can washout and become a hazard to vehicle occupants, normally dry channels may fill up with rushing waters, and ice jam breakups can cause rapidly rising waters along rivers, creeks, and streams.

Flooding regularly affects the agricultural areas of Bottineau County. Much of the most productive croplands are along rivers and creeks in the more lush parts of the county. Such flooding may reduce profits and delay the beginning of the planting season. Should an extreme flood event occur over a wide area, the economy of the affected area could be seriously impacted. Flood events can cut off customer access to businesses as well as close businesses for repairs. The closure of key roadways and rail lines may additionally have an impact on commerce.

Dirty floodwaters often contaminate or destroy everything they touch. Road washouts could disrupt social values as activities are cancelled and travel is limited. Floods are an important part of the health of rivers and streams and therefore should not significantly affect ecological values, unless large quantities of toxins are released into the floodwaters. Maintaining and restoring natural systems help mitigate the impact of flood events on the built environment. Floods change the natural environment and hydrology of the affected area. High water can be beneficial to the natural processes within a floodplain and can benefit riparian areas.

Critical Facilities in Hazard Prone Areas

Like most structures, state-owned buildings and property are certainly vulnerable to floods. The North Dakota State Fire and Tornado Fund insures the state owned buildings and property. However, this fund does not typically provide insurance for flood losses. Table 4.4.6.A summarizes claims paid by the fund to

local government critical facilities, National Guard facilities, state-owned universities and school districts due to flood in Bottineau County.

Table 4.4.6.A Flood Claims Paid on Critical Facilities Insured by the State since 1989

Adjutant General	State University System	Local Government	School Districts	Total
\$0	\$0	\$1,191	\$0	\$1,191

Source: North Dakota State Fire and Tornado Fund, 2013

Damage to public water and sewer systems, transportation networks, electric infrastructure, and flood control facilities can hinder the ability of the government to deliver services. Drinking water, surface water, and wastewater services are provided by a variety of entities throughout the state. During flood events, the infrastructure that supports the water service providers can be damaged and sometimes destroyed. Well contamination may also occur during significant floods. Sewer systems such as municipal facilities and individual septic systems frequently suffer damages.

Road infrastructure is particularly vulnerable to flooding. Road and culvert washouts are common with heavy runoff. Federal, state, county, city, and township governments all have a stake in protecting roads from flood damage. Road networks often traverse floodplain and floodway areas. Bridges are key points of concern during flood events because they are important links in road networks and provide watercourse crossings. Scour critical bridges are especially vulnerable during periods of flooding. Bridges can also be obstructions in watercourses, inhibiting the flow of water during flood events.

4.4.7 Development in Identified Hazard Areas

The National Flood Insurance Program (NFIP) is an insurance program that requires communities to adopt and enforce floodplain management ordinances in order for property owners to purchase federally backed insurance. These ordinances provide some measure of protection for new construction and significant renovations in the floodplain. Unrestricted development may occur in areas prone to flooding but not mapped and in those communities that have identified flood hazard areas but do not participate in the NFIP and lack floodplain management ordinances.

Other key documents related to the flood hazard:

- 2011 Flood Report: Response and Recovery
- State Of North Dakota Department of Emergency Services Legislative Flood Mitigation and Response Study, April 24, 2013
- North Dakota Emergency Operations Plan, Flood Annex
- North Dakota Water Development Reports
- North Dakota NFIP Map Modernization Plan
- The Floods of 1997: A Special Report
- Interagency Hazard Mitigation Team Reports

4.5 Hazardous Material Release

Frequency	Very Likely	Nearly a 100% probability in the next year
Impact	Minor	1%-10% of jurisdiction affected
Risk Class	3	Moderate Risk Requires fast action Address via Response and Contingency Plans
Seasonal Pattern	None	
Duration	Averages 1-6 Hours	
Speed of Onset	Minimal warning	

4.5.1 Description

Hazardous materials are any substances posing an unreasonable risk to safety and health, the environment, and the property of citizens. The term “hazardous materials” envelops a vast array of products, from the relatively innocuous types, such as creosote, to highly toxic or poisonous types, such as anhydrous ammonia and phosgene gas. The severity of potential hazards caused by these materials is varied, but the primary reason for the designation is their risk to public safety.

Table 4.5.1.A Hazardous Materials Classes

Hazard Class Definitions		
Class	Class Name	Example
1	Explosives	Ammunition, Dynamite, Fireworks
2	Gases	Propane, Oxygen, Helium
3	Flammable	Gasoline Fuel, Acetone
4	Flammable Solids	Matches, Fuses
5	Oxidizers	Ammonium Nitrate, Hydrogen Peroxide
6	Poisons	Pesticides, Arsenic
7	Radioactive	Uranium, Plutonium
8	Corrosives	Hydrochloric Acid, Battery Acid
9	Miscellaneous Hazardous Materials	Formaldehyde, Asbestos
None	ORM-D (Other Regulated Material- Domestic)	Hair Spray or Charcoal
None	Combustible Liquids	Fuel Oils, Lighter Fluid

Hazardous material incidents are categorized as uncontrolled releases occurring during transportation (truck or pipeline) or at a fixed source such as a manufacturing or storage facility. Accidental releases may be due to equipment failure, human error, or a natural or man-made hazard event. Although the listed hazardous materials are classified essentially the same in both transportation and fixed facility incidents, the U.S. Department of Transportation is responsible for determining hazardous materials associated with transportation, including pipelines, and the U.S. Environmental Protection Agency (EPA) determines which materials are considered hazardous in fixed facility releases.

Generally, with a fixed facility, the hazards are pre-identified, and the facility is required by law to prepare a risk management plan and provide a copy to the local emergency planning committee (LEPC) and local fire departments.

Fixed facilities housing hazardous substances in Bottineau County include the usual facilities within communities such as swimming pools, gas stations, and supply stores containing substances such as fuel, farm chemicals, propane, fuel oil, paint, and small amounts of chlorine.

Hazardous materials releases often are viewed in a worst case scenario. Some have resulted in the loss of several lives and contamination of soils, rivers, lakes, streams, underground water supplies, and fish and wildlife habitat; however, the majority of incidents involve small spills and releases requiring little response or recovery action. The problem for decision-makers at all levels of government is to create a safe system for the use, storage, and transportation of hazardous materials while expanding the economic viability.

A hazardous material release may also occur due to a transportation accident. The most likely locations for a transportation-related hazardous material release are along the primary federal and state highways along with the railroad system running through the county.

Fixed Facility Locations

In 2013, there were 384 Tier II reporting facilities housing or using hazardous chemicals in Bottineau County identified by the Community Right to Know Act. The facilities must maintain a material safety data sheet and submit the list of chemicals to the North Dakota Department of Emergency Services, Hazardous Chemicals Preparedness and Response Program, the Local Emergency Planning Committee (LEPC) and local fire department. The typical facilities reporting are: bulk fuel plants, anhydrous ammonia plants, propane plants, and agricultural supply plants.

****See Appendix B for complete list of Tier II Facilities in Bottineau County****

In 2014, there were 25 facilities housing extremely hazardous substances (EHS) in Bottineau County. These facilities are required under Occupational Safety and Health Administration regulations to maintain the material safety data sheets and report the chemical quantities that equal or exceed either 500 pounds or the threshold planning quantity.

Pipelines

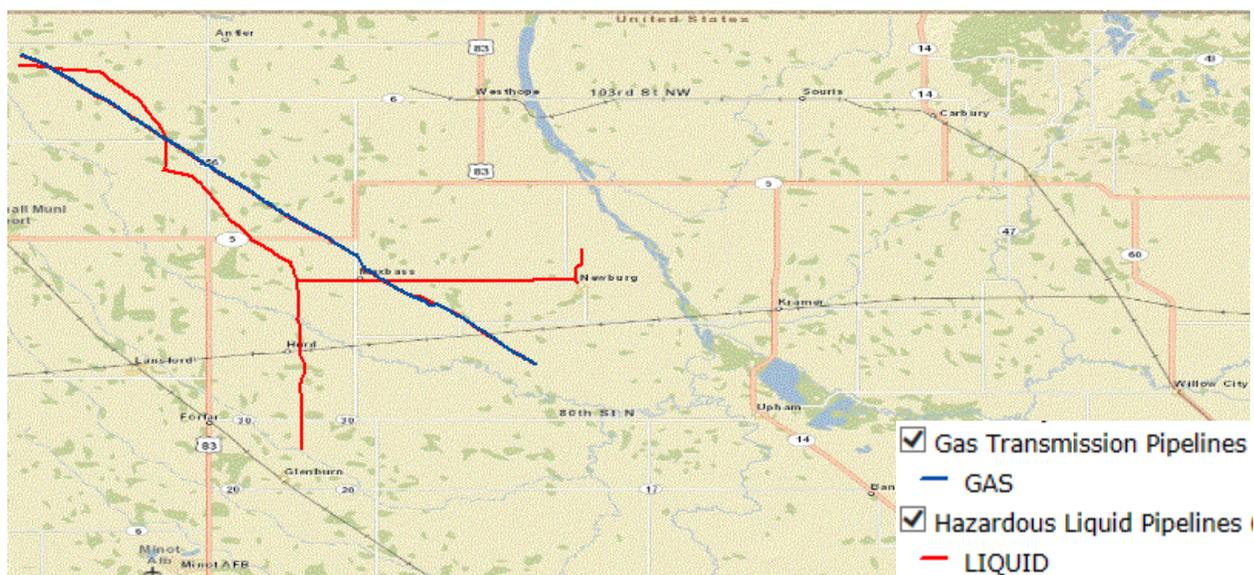
According to the U.S. Department of Transportation, Pipeline & Hazardous Materials Safety Administration’s Pipeline Safety Stakeholder Communications, in 2011, of Bottineau’s two pipelines, one as gas transmission, the other hazardous liquid (oil), Bottineau County has a total of 115 miles of pipelines (33-Gas, 82-Oil) as of 2011.

4.5.2 Geographic Location

Hazardous material incidents can happen anywhere, but the most likely locations are associated with the oil and natural gas industry development, at fixed facilities producing, housing, or using hazardous materials or along the interstate, railroad, and pipeline infrastructure. Figure 4.5.2A shows hazardous materials pipelines in Bottineau County.

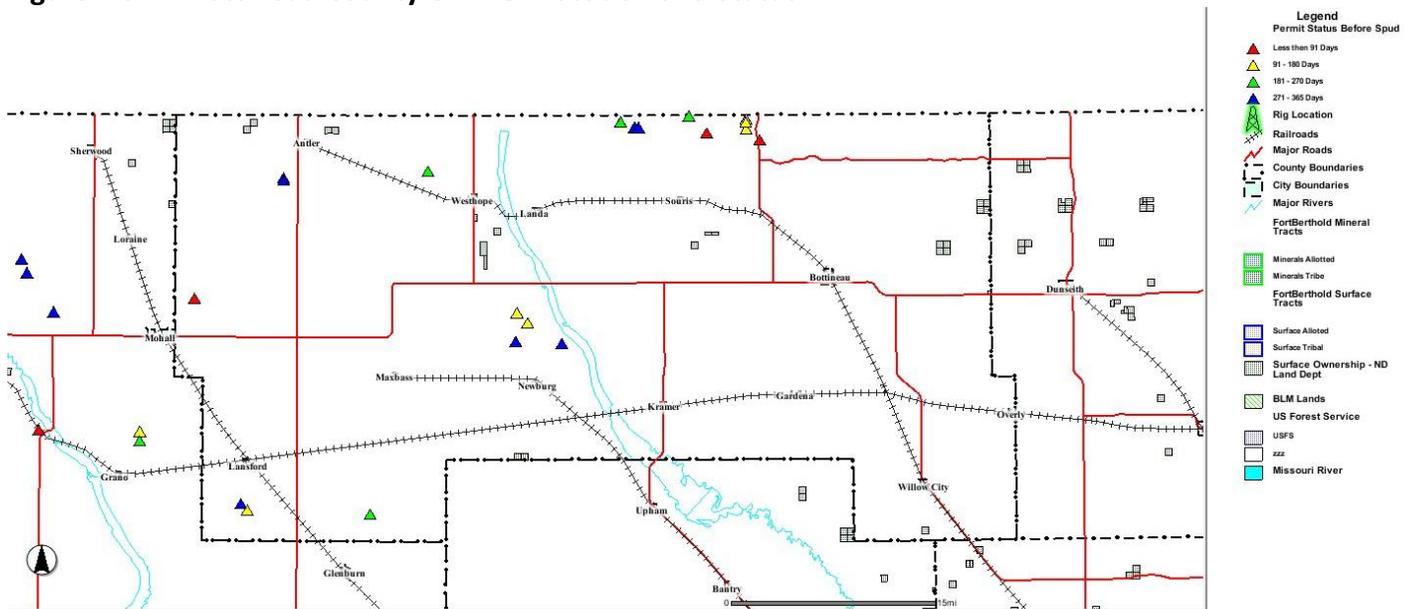
In Bottineau County, affected cities are Newburg and Maxbass.

Figure 4.5.2A Bottineau County Hazardous Materials Pipeline Routes



Source: National Pipeline Mapping System (NPMS), 2015

Figure 4.5.2B Bottineau County Oil Well Location and Status



Source: <https://www.dmr.nd.gov/OaGIMS/viewer.htm>

Bottineau County is known for shipping oil out via trucks, whereas other North Dakota counties use rail and pipelines. The increased transit of hazardous materials across the county increases the vulnerability of a hazardous materials spill.

4.5.3 Previous Occurrences

Table 4.5.3A lists hazardous materials spilled in Bottineau County as reported to the North Dakota Department of Health.

Table 4.5.3A Bottineau County Hazardous Materials Spills

Incident ID	Date Reported	Incident Date	Contaminant	Volume/Units
EIR3260	3/21/2014	3/21/2014	Crude Oil	366 Barrels
EIR2142	12/10/2013	12/7/2013	Water/Oil Emulsion	20 Gallons
EIR1835	12/13/2012	12/11/2012	28% Liquid Nitrogen Fertilizer	2,500 Gallons
EIR1524	9/14/2011	9/12/2011	Crude Oil	5 Gallons
EIR1142	5/21/2009	5/20/2009	Diesel Fuel	450 Gallons
EIR1127	4/16/2009	4/16/2009	Crude Oil	2 Barrels
EIR1124	4/12/2009	4/12/2009	Gasoline, Diesel, Propane	NA
EIR1011	5/27/2008	5/27/2008	Crude Oil	1 Barrel
EIR791	8/12/2005	8/11/2005	Diesel and/or Motor Oils	50 Gallons
EIR704	7/11/2004	7/10/2004	Liquid Propane Gas	200 Gallons

EIR490	11/20/2001	11/14/2001	Oil Well produced Water	2,500 Gallons
EIR486	11/1/2001	11/1/2001	Fuel Oil	100 Gallons
EIR438	7/6/2000	7/5/2000	1034oo Liquid Fertilizer-NPK Ammonium Poly Phosphate	1,500 Gallons
EIR266	1/17/1997	1/17/1997	Gasoline	2,000 Gallons
EIR177	3/24/1993	3/16/1993	Parafin	0 Gallons
EIR90	12/20/1989	12/20/1989	Fuel Oil	1,600 Gallons
EIR100	1/24/1989	1/23/1989	Diesel Fuel	6,000 Gallons
EIR346	12/15/1980	12/12/1980	Diesel Fuel	7,900 Gallons

Source: North Dakota Department of Health - <http://www.ndhealth.gov/EHS/Spills/> , 2015

U.S. Department of Transportation’s Pipeline & Hazardous Materials Safety Administration

Reports from the U.S. Department of Transportation’s Pipeline & Hazardous Materials Safety Administration’s provides detail and incident history for the pipeline systems between 2003 and February 2013. Significant incidents are those incidents reported by pipeline operators with any of the following conditions met: 1) fatality or injury requiring in-patient hospitalization; 2) \$50,000 or more in costs, measured in 1984 dollars; 3) highly volatile liquid releases of five barrels or more or other liquid releases of 50 barrels or more; 4) liquid releases resulting in an unintentional fire or explosion. According to these reports, Bottineau County has had no fatalities or injuries over the period of 2003 - February 2013.

Table 4.5.3B Bottineau County Hazardous Material Release Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

4.5.4 Probability and Magnitude

Table 4.5.4A is a graphical representation of the range of events that can occur within the hazardous material release hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the hazardous material release hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.5.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				Nuclear Release in an Urban Area
	<i>No local history</i>			Hazardous Plume in an Urban Area	
	<i>100 years</i>		Release Requiring Large Evacuation		
	<i>50 years</i>	Spill Requiring Response			
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
	Impact				

Since 1975, only three reports of hazardous material incidents have been documented in Bottineau County to the State Department of Health. Based on this history, it can be assumed that a hazardous materials spill will not occur every month. The frequency of relatively minor hazardous material releases is likely much greater as not all incidents get recorded in the national database.

Although only hazardous material releases with limited damages have occurred in Bottineau County in the past, the potential exists for a release with serious human and property impacts. A serious, yet plausible, scenario includes the release and explosion of a highly toxic substance such as anhydrous ammonia or more common substance such as propane, particularly in the vicinity of the railroad and primary highways, or other substances from the fixed facilities. Affected areas from these types of releases could extend as far away as 5 miles downwind. The greatest magnitude events include those that occur within close proximity to a populated area.

4.5.5 Risk Assessment

Vulnerability Overview

The impacts to people are often greater than the structural impacts as a result of a hazardous material incident. Depending on the material, the health impacts to humans can be long and short term. A hazardous material incident could have a greater impact on those areas with higher population concentrations such as cities, vulnerable population facilities, and businesses, than more rural areas. In a hazardous material release, those in the immediate isolation area would have little to no warning, whereas, the population further away in the dispersion path may have some time to evacuate or shelter in place, depending on the weather conditions, material released, and public notification.

Vulnerabilities to public water supplies also threaten jurisdictions, and contamination could come from sources outside of the county. Surface waters, such as rivers and reservoirs, and underground aquifers used as drinking water sources could each be threatened by releases from fixed facilities, pipelines, and transportation.

Significant losses can also occur to the environment and other ecological values. Clean-up efforts may mitigate the effects, but some losses may occur. Sensitive habitats could be damaged or air and water quality reduced.

The statistical analysis method was used to refine and assess the relative vulnerability to Bottineau County to Hazardous Materials. The State assigned ratings to five pertinent factors that were examined at the county level. These factors are: number of Tier II facilities, and number of incidents reported to NDDDES in 2013, the miles of gas transmission and HazMat liquid pipelines and the number of pipeline incidents from the U.S. Department of Transportation, Pipeline Safety Stakeholder Communications. A rating value of 1-5 was assigned to the data obtained for each factor to obtain vulnerability scores for comparison and to determine the most vulnerable counties. Table 4.5.5A shows the overall hazardous material vulnerability for Bottineau County. Bottineau County's rating is low which is similar to other mainly agricultural based counties that are not along an interstate.

Table 4.5.5A Bottineau County Hazardous Materials Vulnerability Analysis

# of Tier II Facilities	Tier II Facility	# of Reported Incidents to NDEES in 2012	Incident Rating	Gas Transmission Pipeline Miles	Gas Pipeline Rating	Haz-Mat Liquid Pipeline Miles	Liquid Pipeline Rating	Pipeline Incidents 2012	Pipeline Incident Rating	Total Ratings	HAZMAT Analysis
25	1	1	0	0	0	63	2	0	0	3	Low

Source: State of North Dakota Multi-Hazard Mitigation Plan, 2014

Loss Estimates

Sufficient data is not available at this time to make estimates of potential losses by jurisdiction for all types of HAZMAT Incidents. However the following assumptions have been made that begin the process of estimating these actual losses:

- Most HAZMAT events are localized and affect only the immediate area.
- Most events are small in nature and are quickly contained and cleaned.
- Fixed sites can be identified through the federal reporting requirements and some historical event data is available by jurisdiction.
- Maps for highways, railroads and pipelines are available thereby designating the jurisdictions at risk to these specific hazards.
- Most HAZMAT events involve an immediate response and an expedited cleanup with relatively fixed costs.
- Depending on the size and location of a release, the associated costs can range from a few thousand dollars to hundreds of thousands of dollars.
- Losses could include limited loss of life, injuries and sickness for the general population and for the first responders.
- Losses could include the financial costs for response and cleanup.
- There could be significant loss of reputation or confidence in associated organizations.
- There could be short-term impacts to the local economy due to a major event.

The State of North Dakota has identified hazardous material specialized teams in each of the four corners of the State and equipped them with resources to assist in hazardous material response. Bottineau County would have mutual aid from the two HazMat teams in the north located at either Minot or Devils Lake.

4.5.6 Critical Facilities in Hazard Prone Areas

Since hazardous material releases can occur virtually anywhere, critical facilities and infrastructure are at risk from hazardous material releases. Those in close proximity to hazardous materials fixed facilities and transportation, pipeline, or utility infrastructure are at greatest risk. Much of the vulnerability depends on specifically where a release occurs in proximity to the critical facilities and infrastructure. Should a hazardous material release affect one of the critical facilities, the level of emergency services available could be reduced. A release near a special needs facility may present unique evacuation challenges.

4.5.7 Development in Identified Hazard Areas

Generally, future development is not threatened by hazardous material releases. The primary exceptions are those developments that occur near existing hazardous material facilities. In addition, new industries could introduce additional hazardous materials to the area. The threat to and from future development cannot be entirely mitigated but smart land use planning and zoning can locate sites containing hazardous materials away from residential developments, critical facilities, and vulnerable populations. None of the existing land use mechanisms in Bottineau County specifically address this issue, but most are effective at promoting compatible land uses.

4.5.8 Data Limitations and Other Key Documents

The data limitations related to the hazardous material release hazard include:

- Estimating what substances and the quantity that may be released in any given location
- Lack of a study with the numbers and types of hazardous materials being hauled on the highways and railroad in the county

Other key documents related to the Hazardous Material Release hazard include:

- North Dakota Emergency Operations Plan, Hazardous Materials Annex

4.6 Homeland Security Incident

Frequency	Possible	1-10% chance in a given year
Impact	Catastrophic	More than 50% of jurisdiction affected
Risk Class	4	Moderate Potential, High Risk
Seasonal Pattern	None	
Duration	Variable	
Speed of Onset	Little to no warning	

4.6.1 Description

A homeland security incident is any intentional human-caused incident, domestic or international, that causes mass casualties, large economic losses, or widespread panic in the country. Terrorism and civil unrest are examples of human caused hazards that are intentional and often planned. Terrorism, both domestic and international, is a violent act done to try and influence government or the population of some political or social objective. Terrorist acts can come in many recognized forms or may be more subtle using untraditional methods. The primary recognized forms of terrorism are chemical, explosive, biological, radiological, nuclear, and cyber; however, terrorism's only limitation is the human imagination.

Chemical terrorism is the use of chemical agents to poison, kill, or incapacitate the population or animals, destroy crops or natural resources, or deny access to certain areas. Chemical agents can be broken into five different categories: nerve agents, vesicants, cyanide, pulmonary agents, and incapacitating agents.

Traditional Terrorism uses explosive and incendiary devices which includes bombs and any other technique that creates an explosive, destructive effect. Bombs can take many forms from a car bomb to a mail bomb. They can be remotely detonated using a variety of devices or directly detonated in the case of a suicide bomb. These are the most common devices used by terrorist groups due to their high availability, low cost, and ease of use.

Bioterrorism is the use of biological agents, such as Anthrax, Ricin, and Smallpox, to infect the population, plants, or animals with disease.

Radiological Terrorism involves the use of radiological dispersal devices or nuclear facilities to attack the population. Exposure to radiation can cause radiation sickness, long-term illness, and even death. Terrorism experts fear the use of explosive and radiological devices in the form of a "dirty bomb" to attack the population. A "dirty bomb" is a low-tech, easily assembled and transported device made up of simple explosives combined with a suitable radioactive agent.

Cyberterrorism is the attack or hijack of the information technology infrastructure that is critical to the functions controlled by computer networks such as: operating, financial, communications, and trade systems. Any cyber attack that creates national unrest, instability, or negatively impacts confidence of citizens/consumers can be considered cyberterrorism.

In neighboring Ward County, Minot Air Force Base, which houses nuclear missiles and bombs, has been seen as a major target by terrorists and other nation states since the beginning of the Cold War. Minot AFB is responsible for 150 Minutemen III missiles and is one of only three remaining bases that maintains and operates the Minutemen III Intercontinental ballistic missile. Within Bottineau County, there are 12 DoD-controlled Launch Facilities (LF) and 1 manned Missile Alert Facility (MAF). From a homeland security perspective, the threat to these DoD-controlled facilities is very low.

Civil disorders and violence typically occur on a smaller scale than terrorism when large groups, organizations, or distraught individuals take action with potentially disastrous or disruptive results. Civil disorders can result following a disaster that creates panic in the community. Civil disorder is generally defined as “any conduct of more than one person that destroys or menaces the public order and tranquility.” Forms of civil disorder can range from groups blocking sidewalks, roadways, and buildings to mobs rioting and looting to gang activity. Civil unrest may be spontaneous, as when a mob erupts into violence, or they may be planned, as when a demonstration or protest intentionally interferes with another individual or group’s lawful business.

Most times, homeland security incidents, both domestic and international, are driven by a terrorist group or hate organization. Occasionally, individuals perform independent acts. Usually, the perpetrators have an underlying belief that drives the act. Definitions of several types of Hate and Terrorist Organizations are listed below as provided by the North Dakota State and Local Intelligence Center (SLIC):

- Anarchist Extremists: Groups or individuals who facilitate or engage in acts of violence as a means of changing the government and society in support of the belief that all forms of capitalism and corporate globalization should be opposed and that governing institutions are unnecessary and harmful to society.
- Animal Rights Extremists: Groups or individuals who facilitate or engage in acts of violence directed against people, businesses, or governmental entities perceived to be exploiting or abusing animals.
- Anti-Abortion Extremists: Groups or individuals who facilitate or engage in acts of violence directed against providers or abortion-related services, their employees, and their facilities in support of the belief that the practice of abortion should end.
- Black Supremacist Extremists: Groups or individuals who facilitate or engage in acts of violence as a means to oppose racial integration and/or eliminate non-black people and Jewish people.
- Domestic Terrorists: Groups or individuals who commit and act of violence that is dangerous to human life or potentially destructive or critical infrastructure or key resources. These groups or individuals are based and operating entirely within the United States or its territories without direction or inspiration from a foreign terrorist group. The act of domestic terrorism is a violation of the criminal laws of the United States or of any state or other subdivision of the United States and appears to be intended to intimidate or coerce a civilian populations, to influence the policy of a government by intimidation or coercions, or to affect the conduct of a government by mass destruction, assassination, or kidnapping. A domestic terrorist differs from homegrown violent extremist in that the former is not inspired by and does not take direction from a foreign terrorist group or other foreign power.

- Environmental Rights Extremists: Groups or individuals who facilitate or engage in acts of violence against people, businesses, or government entities perceived to be destroying, degrading or exploiting the natural environment.
- Homegrown Violent Extremist (HVE): A homegrown violent extremist (HVE) is a person of any citizenship who has lived and/or operated primarily in the United States or its territories who advocates, is engaged in, or is preparing to engage in ideologically-motivated terrorist activities (including providing support to terrorism) in furtherance of political or social objectives promoted by a foreign terrorist organization, but is acting independently of direction by a foreign terrorist organization. HVEs are distinct from traditional domestic terrorists who engage in unlawful acts of violence to intimidate civilian populations or attempt to influence domestic policy without direction from or influence from a foreign actor.
- Lone Offender: An individual motivated by one or more violent extremist ideologies that, operating alone, supports or engages in acts of violence in furtherance of that ideology or ideologies that may involve influence from a larger terrorist organization or a foreign actor.
- Militia Extremists: Groups or individuals who facilitate or engage in acts of violence directed at federal, state, or local government officials or infrastructure in response to their belief that the government deliberately is stripping Americans of their freedoms and is attempting to establish a totalitarian regime. These individuals consequently oppose many federal and state authorities' laws and regulations, (particularly those related to firearms ownership), and often belong to armed paramilitary groups. They often conduct paramilitary training designed to violently resist perceived government oppression or to violently overthrow the US Government.
- Racist Skinhead Extremists: Groups or individuals who are a subcategory of white supremacist extremists that facilitate, support or engage in acts of violence directed towards the federal government, ethnic minorities, or Jewish persons in support of their belief that Caucasians are intellectually and morally superior to other races and their perception that the government is controlled by Jewish persons. Racist skinheads consider themselves to be the frontline soldiers of white supremacist extremist and frequently distinguish themselves from other violent white supremacist extremists by a distinctive style of dress.
- Sovereign Citizen Extremists: Groups or individuals who facilitate or engage in acts of violence directed at public officials, financial institutions, and government facilities in support of their belief that the legitimacy of US citizenship should be rejected; who believe that all forms of established government, authority, and institutions are illegitimate and that they are immune from federal, state and local laws.
- Terrorism: Any activity that involves an act that is dangerous to human life or potentially destructive to critical infrastructure or key resources, and is a violation of the criminal laws of the United States or of any state or other subdivision of the United States and appears to be intended to intimidate or coerce a civilian population to influence the policy of a government by intimidation or coercion, or to affect the conduct of a government by mass destruction, assassination, or kidnapping.
- White Supremacist Extremists: Groups or individuals who facilitate or engage in acts of violence directed at the federal government, ethnic minorities, or Jewish persons in support of their belief that Caucasians are intellectually and morally superior to other races and their perception that the government is controlled by Jewish persons.

Specific to North Dakota is the Little Shell Pembina Band. Law enforcement officers and public officials around the country are encountering members of a new and active anti-government extremist group that calls itself the "Little Shell Pembina Band of North America." Members of the group claim that they belong to a "sovereign" Native American tribe and therefore are not subject to laws and regulations; in reality, the "Little Shell Pembina Band" is part of the anti-government "sovereign citizen" movement. Its members' activities range from driving with unlawful license plates to perpetrating insurance fraud schemes to tax evasion. The group is primarily based in North Dakota and Washington, but members can be found across the nation. The group has split into two competing factions, but each use the same name. According to the Southern Poverty Law Center Intelligence Project, a White Nationalist group, the Frontline Aryans, have an active cell in Minot. (North Dakota Department of Emergency Services, 2013)

Table 4.6.1 Terrorism Prone Critical Facilities

Facility	Visibility	Criticality	Impact	PTE	Hazard	Site	Collateral	Total
Water Treatment Plant	Information is confidential and held in 2003 ODP Assessment							
Natural Gas Pipeline								
Natural Gas Pumping Stations								
Natural Gas Pipeline Ports								
Oil Pipeline								
Railroad								
Interstate								
Telephone								
Public Health Unit								
Military Base (Air Force)								
Health Clinic								
Nursing Home/Senior Housing								
Schools								
Government buildings								
Bulk Fuel								
Anhydrous Ammonia plants								
Fertilizer / Ag Chemical Plant								
Grain and Ag Chemical handling facilities.								

Table 4.6.1 identifies those facilities in the county that have been identified as being at risk from a civil disorder/terrorist event. The method for calculating the total risk was identified by the Department of Homeland Security for their 2003 Office for Domestic Preparedness Assessment and included:

- Visibility of the target on an area, local, regional, state and national level.
- Criticality of the target to the local jurisdiction, regional and national level.
- Impact on the community, region, and nation.
- Potential threat elements within the area that have reason to target the facility.
- Other hazards such as CBRNE that may have a secondary effect.
- Population that may be affected at the facility.
- Collateral population that may be affected near the facility.

For security reasons the total score was utilized to represent the overall assessment of the facility. Further questions should be addressed to local law enforcement and the emergency manager.

4.6.2 Geographic Location

Given the uncertainties associated with homeland security incidents, uniform risk is assumed throughout the county. In general though, jurisdictions with large, dense population areas are more vulnerable to Homeland Security Incidents as special events with large populations gathered at a specific site. In Bottineau County, this would include the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City.

4.6.3 Previous Occurrences

Fortunately, Bottineau County has not been the location of a modern homeland security incident. Significant terrorist acts occurring in the United States since 1950 include:

January 27-29, 1975 – In New York City, a bomb at a Wall Street bar killed 4 and injured 60. Two days later, a bomb exploded in a US Department of State bathroom. A domestic terrorist organization claimed responsibility.

August 3, 1977 – Two bombs were left at offices in New York City, killing one person and injuring eight; one building housed US Department of Defense personnel. The bombs were planted by members of the Armed Forces of National Liberation (FALN), a Puerto Rican pro-independence organization.

February 29, 1993 – A bombing in the parking area of the World Trade Center killed 6 and wounded about 1,000. The bombing was organized by the foreign terrorist organization, Al Qaeda.

April 19, 1995 – Domestic terrorist Timothy McVeigh blew up the Alfred P. Murrah Federal Building in Oklahoma City, killing 168 people and injuring hundreds more.

September 11, 2001 – Four commercial planes hijacked by 19 members of the Al Qaeda terrorist organization were intentionally crashed into buildings; two planes hit the World Trade Center buildings in New York City, one into the Pentagon outside Washington, DC, and one into a field in Pennsylvania after passengers stormed the cockpit. Nearly 3,000 people were killed.

October 2001 – Letters containing the deadly anthrax bacterium were mailed to members of Congress and television networks. One person died.

2011 – In 2011, the ND SLIC provided information to the intelligence community on six subjects encountered in North Dakota who are on the FBI Terrorist Watch List. There were three instances of rail tampering in 2011 and solicitation of information concerning rail, two incidents of suspicious photography concerning rail and two incidents of suspicious surveillance of railroad property. There were five reports of

suspicious aircraft or persons at airports in North Dakota in 2011. There were suspicious packages, a threat made to North Dakota bridges and dams, a threat made to the President of the United States from North Dakota, solicitation of information on gun ranges, as well as suspicious photography at military installations and suspicious persons at military installations reported to the ND SLIC. The ND SLIC assisted authorities on a report of a subject attempting to obtain chemicals that could be used for bomb making purposes, arms trafficking investigations and cross border drug trafficking cases.

2012 – In 2012, the ND SLIC analysts handled 259 requests for information or case support with a crime or Homeland Security nexus from Federal entities such as the Department of Homeland Security (DHS), Federal Bureau of Investigation (FBI), Department of Energy (DOE), OSI Systems, Inc., National Nuclear Security Administration (NNSA), and Department of Domestic Security (DDS). Fusion Centers from around the country made 168 requests for information or shared information with the ND SLIC. There were 380 requests for assistance from North Dakota Police Departments, 184 requests from North Dakota Sheriff's Offices, 526 requests from State Agencies such as the North Dakota Highway Patrol (NDHP) and North Dakota Bureau of Criminal Investigation (NDBCI), 80 requests for information from local law enforcement outside of North Dakota, 405 requests from the various task forces in North Dakota, three requests from tribal authorities, 65 from military police in North Dakota and 19 requests for assistance from the private sector, not including critical infrastructure.

North Dakota is not immune to homeland security incidents. In many cases, information about past threats that have been thwarted is not publicly distributed. The North Dakota State and Local Intelligence Center (SLIC) provided the following information on previous occurrences of Homeland Security Incidents in 2011 and 2012:

Although the ND SLIC does not normally get follow-up information from law enforcement agencies that it has aided, the ND SLIC is aware of being instrumental in the capture of over 30 criminals from all over the United States in 2012.

In 2012, The ND SLIC provided information to Homeland Security agencies on six subjects encountered in North Dakota who are on the FBI Terrorist Watch list. There were five bomb threats and one actual bomb in North Dakota that the ND SLIC assisted authorities with in 2012 as well as threats originating from North Dakota to the President of the United States. Suspicious Activities were recorded by the ND SLIC in 2012 such as a threat to a dam by an individual, suspicious photography at a major refinery, solicitation of information at Military installations, numerous suspicious packages, information on a subject on the —no fly list who attended a flight school in North Dakota, possible chemical tampering of soap in a public restroom and suspicious aircraft landing or flying low.

April 2013 – Boston Marathon Bombing. Two bombs near the finish line of the Boston Marathon killed 3 people injured more than 200 additional people. Two suspects were identified as brothers, Tamerian and Dzhokhar Tsarnaev. Tamerian Tsarnaev was killed in a confrontation with police and Dzhokhar arrested nearby. The two are also suspected of fatally shooting a police officer in Cambridge prior to the police chase. (Memorial Institute for the Prevention of Terrorism, 2013)

The Historical Society of North Dakota and North Dakota Department of Emergency Services provided the following specific examples of relatively minor incidents that have occurred in North Dakota:

1933 – A violent strike erupted at the new North Dakota Capitol construction site and required help from the North Dakota National Guard.

February 13, 1983 - Federal law enforcement officers went to Medina, to arrest Gordon Kahl on a Texas warrant. Kahl farmed in Heaton, north of Medina. He was a decorated war veteran and a tax protester who had served time for refusing to pay his taxes. The warrant accused him of violating his probation. On the morning of February 13, Gordon Kahl, his wife, Joan, his son Yorie Kahl, and two friends David Broer and Scott Faul, gathered at Dr. Clarence Martin's clinic in Medina to talk right-wing politics. After the meeting, Kahl's group headed north out of Medina, toward home. They met a roadblock. Gordon and Yorie Kahl, Faul, and Broer got out of their cars. There was a brief verbal confrontation and gunfire erupted. Marshal Kenneth Muir and Deputy Marshal Robert Cheshire died. Two additional law enforcement officers and Yorie Kahl were hurt. Gordon Kahl vanished. Authorities caught up with him in June of 1983 near Smithville, Arkansas, where he died in a shootout and fire. Yorie Kahl and Faul are serving life sentences in the murders.

January 22, 1995 - A lone vandal cut 19 underground telephone cables at five Fargo locations. The sabotage disrupted service to more than 20,000 US West customers in Fargo and northwestern Minnesota for several days. Damage was estimated at \$1 million. Fargo police traced the vandalism to Michael Damron, then a 31-year-old North Dakota State University electrical engineering student. On January 24, Damron fled Fargo after refusing to let police search his apartment. A search later turned up the gas-powered saw Damron used to cut the lines, a notebook listing plans for the sabotage, a map marked with the sites of the cut lines, and a list of possible getaways, including "motorized hang glider, dirt bike, golf cart, scuba-diving equipment." Damron remained at large for nearly two years before FBI agents caught him in Iowa. His bail was set at \$1 million when he returned to Fargo. Damron was sentenced to 10 years in prison in 1997 after he plead guilty to cutting the phone lines and to possessing stolen electronic equipment.

January 2005 - Twenty-nine-year-old Chad Reinhardt was hired by Farstad Oil Company in Minot in 2004 as a warehouse worker. Reinhardt is believed to have set fire to the warehouse to try to destroy evidence in an investigation into whether he made improper charges on a corporate credit card. Reinhardt pleaded guilty to arson and burglary in May of 2005. The Farstad Oil Company had to move its staff and warehouse. Reinhardt was sentenced to nine years in prison for starting the fire that caused millions of dollars in damages.

August 19, 2005 – A police officer was shot and two public buildings were set on fire in Cavalier when police officers attempted to serve a restraining order to a North Dakota farmer. James Thorlakson, a Hensel farmer fled after shooting Cavalier Police Chief Ken Wolf and setting the Pembina County courthouse and law enforcement center on fire. The drama started at approximately 4 p.m. when county officers attempted to serve Thorlakson with a protection order. He reportedly was armed and refused to be served.

He then fired on officers and escaped. The firefighters said the blazes were started with cans of gasoline thrown through glass doors into the entryways of the two buildings. The law enforcement center suffered minor damage and the prisoners had to be relocated. A standoff lasted for several hours before he was captured. The Grand Forks SWAT team and at least one helicopter assisted during the operation. Cavalier residents and businesses were told to lock their doors and stay inside. Road blocks were set up around the courthouse and in two rural areas, including Thorlakson's home. Thorlakson was captured at about 10:45 p.m.

Within North Dakota, recent hate incident as reported by the Southern Poverty Law Center include:

October 2004 – A mosque was vandalized in Fargo.

April-May 2008 - A Jewish student at the University of North Dakota was harassed by a group of student using racial slurs and obscenities. Five swastikas in four months were drawn on a building on campus.

June, 2011 – A Nelson County farmer refused to return three cow/calf pairs that had strayed onto his land. The farmer threatened whoever tried to retrieve the cattle. He was tasered while being arrested for not complying with law enforcement orders. After being placed in a squad car, he did damage to the vehicle. His daughter was arrested at this time after hitting a deputy sheriff. While serving the warrant to retrieve the cattle, the farmer’s three sons pointed weapons at the Sheriff and one deputy. A representative of the North Dakota Stockmen’s Association was also present. The Grand Forks SWAT, Grand Forks Bomb Squad, Griggs County Sheriff, Lakota Ambulance and Michigan Ambulance responded at this time. The Devils Lake Ambulance contacted Bottineau County officials to make available their services. A United States Border Patrol Drone was used to locate the family members resulting in the three sons being arrested the next day by the Grand Forks SWAT when they attempted to water and feed the three cow/calf pairs. Bottineau County Deputies transported the three sons to the Devils Lake Law Enforcement Center. After making bail the family refused to attend court and warrants were re-issued. The three sons refused to leave their farm resulting in an arrest three months later. The farmer was sentenced to jail and his sons were placed on probation.

Table 4.1.5B Vulnerable Populations by close living conditions

Facility Name	Type	Location	Population
St. Andrew’s Health Center	Hospital	Bottineau	25 Bed
St. Andrew’s Health Center Apartments	Living	Bottineau	14 Apartments
Good Samaritan Nursing Home	Living	Bottineau	65 Beds
Bottineau Public Schools (K-12)	School	Bottineau	651 Students
Westhope Public Schools (K-12)	School	Westhope	70 Students
Dakota College	College	Bottineau	169 On-Campus Students
Oak Manor	Living	Bottineau	30 Apartments
Janet Bechtold	Daycare	Bottineau	18 Children
Charlotte Bedlion	Daycare	Bottineau	18 Children

Heather Belcourt	Daycare	Bottineau	17 Children
Jodi Gustafson	Daycare	Bottineau	16 Children
Cindy Lagasse	Daycare	Bottineau	10 Children
Patty Monson	Daycare	Bottineau	18 Children
Louise Schneiderman	Daycare	Bottineau	9 Children
Rachael Stewart	Daycare	Bottineau	15 Children
Candace Trottier	Daycare	Westhope	12 Children
Samantha Werner	Daycare	Newburg	18 Children
Lupe Wuster	Daycare	Bottineau	15 Children
Ann Zorn	Daycare	Bottineau	18 Children
Building Blocks Learning Center	Center	Bottineau	65 Children
Sandra Anderson	Family Provider	Lansford	9 People
Lynette Dubois	Self-Declared	Bottineau	5 Children
Nancy Erickson	Self-Declared	Westhope	5 Children
Agnes Schumacker	Self-Declared	Westhope	5 Children

Various other minor forms of civil disruption have happened but can usually be dealt with on a local level without being considered terrorism.

Table 4.6.2A Bottineau County Homeland Security Incident Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

4.6.4 Probability and Magnitude

Table 4.6.4A is a graphical representation of the range of events that can occur within the homeland security incident hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the homeland security incident hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.6.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>			Bombing of Large Building	Statewide Nuclear Attack
	<i>No local history</i>				
	<i>100 years</i>	Disruptive Strike	Multiple Victim Shooting		
	<i>50 years</i>				
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

The probability of a homeland security incident affecting Bottineau County directly is difficult to determine. The county is not considered a specific terrorist target nor is it an area at high risk for civil disorders. As with any area, a shooting by a disgruntled person, employee, or student is always possible. A large scale attack cannot be ruled out, and therefore, a small probability exists. Of greater probability is a terrorist attack that has an indirect effect on the county through its economy. The September 11th terrorist attacks in New York, Washington, and Pennsylvania had a significant impact on the national economy and required the activation of local resources. Another attack could have a similar effect. Such an attack in another part of the country has a greater probability than a direct attack within Bottineau County, but even the probability of such an attack elsewhere is unknown and is the subject of debate.

An attack on the United States that collapses the national economy, agricultural economy, or requires warfare and the drafting of soldiers is considered a high magnitude event. On a smaller but very significant scale would be an attack on a facility such as a school or business involving shooters, homemade bombs, or the taking of hostages. Schools and universities across the country have struggled with similar events, and therefore, such an incident is possible, although not likely, in Bottineau County.

4.6.5 Risk Assessment

Vulnerability Overview

The effects of homeland security incidents are usually felt by the general population. During attacks and times of unrest, the greatest risk is to human lives. Terrorists typically try to make a dramatic statement that will generate media interest. Attacking the population through a large loss of life is a common tactic. Depending on the type of attack, casualties could be light or encompass much of an urban population.

Terrorist attacks generally have a damaging effect on the economy as well. Any time the public's safety is compromised, more people stay home until they are more confident in their safety. Therefore, depending on the type of attack and remaining threat, the tourism and travel industries may be affected. Additionally, attacks on the national informational or financial infrastructure could lead to significant declines in the national economy. Specific to Bottineau County, attacks on agriculture could lead to substantial direct losses in the state.

Ecological values could be harmed if a damaging chemical, biological, or radioactive agent is used. Additionally, social values can be affected with any sort of homeland security incident, particularly one that occurs locally. Community members may not feel safe and may have lasting emotional impacts.

In 2002, each county and tribe conducted a homeland security risk assessment, including the threat, vulnerability, and an optional agricultural vulnerability assessment for their jurisdiction. The jurisdictional working groups were able to use planning factors to provide a numerical focus for homeland security scenarios. Shortfalls or gaps discovered during the assessment process target specific resources required to respond to homeland security incidents. These tiers measure the ability of the county or tribe to respond to a homeland security incident. The assumption is that those jurisdictions with a higher ability to respond are

also at higher risk due to a larger population base and more commercial and industrial values at risk. This assumption may not be entirely accurate, but is the best basis available for the jurisdictional ratings. Bottineau County was determined to have less than a 1.50 tier from this 2002 assessment. This is the lowest rating possible.

Bottineau has the highest vulnerability because it is the County Seat and the County Courthouse may be targeted by people with extremist views. Bottineau is also home to Dakota State College, another possible terrorist target. The other communities in Bottineau County are all under 300 residents and should not be considered as a viable threat to terrorists.

Loss Estimates

Potential losses from Homeland Security Incidents include all infrastructure, critical facilities, crops, humans and animals. The degree of impact would be directly related to the type of incident and the target. Potential losses could include cost of repair or replacement of damaged facilities, lost economic opportunities for businesses, loss of human life, injuries to persons, loss of food supplies, disruption of the food supply chain, and immediate damage to the surrounding environment. Secondary effects of infrastructure failure could include public safety hazards, spread of disease, increased morbidity and mortality among the local and distant populations, public panic and long-lasting damage to the environment. Terrorism events are rare occurrences and specific amounts of estimated losses for previous occurrences are not available due to the complexity and multiple variables associated with these types of hazards. In some instances, information about these events is secure and unavailable to the public in order to maintain national security and prevent future attacks.

As discussed previously, it is difficult to quantify potential losses in terms of the jurisdictions most threatened by homeland security events due to the many variables and human element. A major terrorist attack making a direct impact in Bottineau County, however, is not expected. Perhaps the greatest threat to the communities is a disgruntled student, employee, or resident threatening others with violence. The extreme example of a bomb, depending on its size, could cause structural losses to a critical facility. Homeland security officials emphasize that potential targets include our nation's delicate infrastructure. Should an attack occur, Bottineau County could locally lose electricity, telephone, or internet services. More localized incidents could disrupt water or sewer services. Other attacks could limit fuel or propane supplies and affect transportation and heating capabilities. During times of unrest, the greatest risk is to human lives. Terrorists typically try to make a dramatic statement that will generate media interest. Attacking the population through a large loss of life is a common tactic. Depending on the type of attack, casualties could be light or involve much of the Bottineau County population.

4.6.6 Critical Facilities in Hazard Prone Areas

The North Dakota Critical Infrastructure Program (CIP) at NDES has collected data on Critical Infrastructure and Key Resources (CIKR) that exist in the State of North Dakota. Out of the statewide CIKR inventory, the CIP has identified specific facilities that are critical to homeland security in seven different sectors as follows:

- Food / Agriculture: major food distribution centers
- Energy: power generation and chemical facilities
- Public Health: hospitals and public health offices
- Transportation: bridges and major highways
- Emergency Services: police, fire and dispatch centers
- Communications: major communications towers
- Water: treatment facilities

The criteria used in identification of specific facilities and facility names and specific locations are protected for security reasons and cannot be directly published in a public plan such as this. However, a summary of the number of CIKR facilities critical to homeland security from the State’s perspective has been provided and is shown in Table 4.6.6A. Bottineau County has some of the fewest CIKR facilities of counties in North Dakota.

Table 4.6.6A Bottineau County Summary of Selected CIKR Facilities Critical to Homeland Security

Food/Agriculture	Energy	Public Health	Transportation	Emergency Services	Communications	Water	Total
0	1	1	1	2	1	0	6

Source: North Dakota State Hazard Mitigation Plan, 2014

Critical facilities and infrastructure play prominent roles in Bottineau County. Often, terrorists target facilities that are highly important for government services and community stability.

Bottineau County has had \$5,398 in losses paid out of the North Dakota Tornado and Fire Fund for vandalism and theft at state agency facilities, local government critical facilities (including: counties, cities, townships, airport authorities, fire districts, water districts, and other categories), state-owned universities and school districts; all of which can be considered critical or essential facilities since 1989.

4.6.7 Development in Identified Hazard Areas

Development should have little to no impact on the homeland security incident hazard; except for the increase in population and the associated increase in potential for life and property losses should an event occur.

4.6.8 Data Limitations and Other Key Documents

The data limitations related to the homeland security incident hazard include:

- Inability to quantify the probability and magnitude of an event
- General uncertainties related to homeland security incidents

Other key documents related to the Homeland Security Incident hazard include:

- North Dakota Emergency Operations Plan, Terrorism Annex
- North Dakota Threat and Hazard Identification and Risk Assessment (THIRA)

4.7 Shortage or Outage of Critical Materials or Infrastructure

Frequency	Likely	Nearly 100% Probability in the next year
Impact	Significant	25-50% of Jurisdiction affected
Risk Class	4	Significant Impact
Seasonal Pattern	None-Highest probability of occurrence is during or after another hazardous incident that has somehow depleted resources.	
Duration	Days to Months	
Speed of Onset	Minimal warning	

4.7.1 Description

A shortage or outage of critical materials or infrastructure occurs when the demand for a life sustaining product exceeds the supply. These shortages and outages may include a wide variety of resources including energy-related products, power transmission, medical products, food, and water.

The disruption of the critical material supply system, whether caused by natural or human-caused disasters, global conflict, or embargoes, could severely diminish existing supplies, thereby threatening the immediate and long term health, safety, and well-being of Bottineau County citizens.

Examples of shortages or outages of critical material or infrastructure include:

- Widespread and prolonged electric power failure that impacts both day-to-day and emergency capabilities.
- A lack of transportation fuels causing surface movement gridlock and disruption of commerce.
- Diminished supplies of heating fuels during the winter causing severe economic and health impacts.
- A lack of medical supplies especially vaccines, antibiotics, and anti-viral medications posing a public health and safety threat.
- Private hoarding, compounding a shortage problem.
- A lack of adequate food, water, and shelter.

The public has come to rely upon utilities, communication, and fuel services for everyday life and basic survival. Many in Bottineau County residents depend on the typical utility and communication infrastructure such as water, sewer, electricity, propane, natural gas, telephone, internet, gasoline, and water. Water and sewer services are either provided through a public system or through individual wells and septic systems. Electricity is primarily provided by regional electric companies through overhead or buried lines. Homes and businesses are heated with fuels such as natural gas, propane, oil, and electricity. Those buildings heated with propane or oil typically have a nearby tank that is refilled regularly by a local vendor but still rely on electricity to power their heating systems. Natural gas is provided through underground piping. Telephone, cellular telephone, and internet services are provided by several local and national companies. Privately-owned gas stations are located throughout the county.

Almost any hazard can cause a shortage or outage of critical materials or infrastructure, but disruptions can also occur due to human error, equipment failures, global markets, or low supplies. The most common

hazards that interrupt electric services are heavy snow, ice, and wind. Water supplies may be threatened by drought. Sewer services can be disrupted by flood. Often these types of outages are short lived. Crews quickly respond and resolve the problem causing the outage. During a widespread or complicated outage, services may be down for days or even weeks. Most problems arise during these longer term outages. For example, electricity is needed to maintain water supplies and sewer systems, but also to run blowers for heating systems. Essentially, without electricity, most facilities are without heat, water, fuel, or other appliances during a long term outage. This problem becomes particularly significant during the cold winter months. Telephone services are important for day-to-day business, but are most important for 911 communications in an emergency. Without telephone service, emergency services can be severely delayed. In most cases, a long term utility outage would force many businesses to close until the services were restored. Gasoline shortages are also common during times of disaster.

Space Weather

According to the NOAA Space Weather Prediction Center, Space Weather is the condition in space that affects Earth and its technological systems. Space Weather is a consequence of the behavior of the Sun, the nature of Earth's magnetic field and atmosphere, and our location in the solar system. The active elements of space weather are particles, electromagnetic energy, and magnetic field, rather than the weather contributors on earth of water, temperature, and air.

The Space Weather Prediction Center forecasts space weather to assist users in avoiding or mitigating severe space weather. These are storms that originate from the sun and occur in space near Earth or in the Earth's atmosphere. Most of the disruptions can be categorized into three types of events that can have environmental effects on Earth. They are: geomagnetic storms, solar radiation storms, and radio blackouts. The effects of these storms are increasing in relation to our dependence on technology and basically affect electronic devices. There are no recorded space weather effects in Bottineau County. The nearest storm affected essentially the entire Canadian Province of Quebec on March 13, 1989 when a geomagnetic storm took out their commercial electric power for 9 hours.

4.7.2 Geographic Location

Essentially, all jurisdictions rely on critical materials and infrastructure in some fashion. Mapping of utility and communications infrastructure is maintained by the individual services providers. The County Emergency Operations Plan maintains lists of providers of public utilities in the county for electricity, natural gas, propane, water, and telecommunications.

4.7.3 Previous Occurrences

North Dakota, and subsequently Bottineau County, has experienced three separate major statewide incidents involving shortages of critical materials. The flood of 1997 also caused major critical infrastructure damages and disruptions of services. Utility outages have frequently occurred with severe thunderstorms, tornadoes, strong winds, ice storms, extreme cold, and blizzards. Details on those specific events can be found in the associated hazard profiles.

1970's Oil Embargo: International events caused the price of gasoline to rise significantly, and many Americans experienced long lines at gas stations and were rationed in the amount of gasoline they were able to buy. During the oil embargo, a "state of disaster emergency" was declared to meet the dangers inherent from a critical fuel shortage to the citizens of North Dakota. As a result, the following steps were immediately implemented by all state agencies to conserve energy resources:

- Provisions to eliminate duplication of travel were implemented.
- Fuel-efficient policies regarding the use of and purchase of state vehicles were implemented.
- Temperature control limits and regulations were set for all state buildings.
- Lighting controls and regulations were set for all state buildings.
- Energy conservation public information was coordinated among state agencies and targeted to all residents of North Dakota.

A fuel allocation program was established under federal authority whereby 3 percent of motor gasoline and 4 percent of middle distillate fuels brought into the State were —set aside to be reallocated to retailers who were experiencing temporary shortages.

1970's Anti-Freeze Shortage: The anti-freeze shortage occurred prior to and during the winter months when it is critical to protect cooling system liquids from freezing in automobile engines. Distributors were able to receive ample stocks, but state officials monitored the situation and prepared to activate the State Emergency Operations Plan, which would have allowed them to exercise control over existing supplies, making sure the needs of all citizens were addressed. Because of this situation, state officials monitor distribution of this product annually to ensure proper supply.

1980's Farm Fertilizer Shortage: During the fertilizer shortage, phosphate, one of three primary ingredients used in farm fertilizers, was in short supply. Fertilizer has become an absolute necessity to maintain agricultural production levels, which aid in stabilizing the state's economy. State officials monitored the situation and were prepared to activate the State Emergency Operations Plan to exercise controls over phosphate supplies. Much the same as during the anti-freeze shortage, specific actions were not required, but State Agriculture Department officials monitored distribution of farm fertilizers to ensure adequate supplies. Agriculture officials monitor fertilizer supplies on a yearly basis to ensure that timely actions are implemented to avert a shortage.

1997 Flood: During the 1997 Red River flood, many critical services, including electricity, water, and sewer services, were disrupted for a significant period of time in the eastern portion of North Dakota. This put additional strain on the northern region of the State to include flooded Bottineau County communities. Additional information regarding this disaster can be found in the Flood Hazard Profile.

2009-2010 Winter Electric Outages: Two devastating storms caused severe and prolonged electric outages in rural areas. One rural electric cooperative, Mor-Gran-Sou Electric, headquartered in Flasher, lost over 500 miles of line with over 10,000 downed poles. Some customers were out of power for nearly one month according to the North Dakota Association of Rural Electric Cooperatives.

2014 Natural Gas Pipeline Explosion: On January 25, 2014, a TransCanada Corporation natural gas pipeline rupture in the Canadian province of Manitoba, which put three pipelines out of service in the hours ahead of Blizzard Era Bell and sub-arctic temperatures in North Dakota, including Bottineau County. Several natural gas suppliers for the area, including Xcel Energy, requested customers in eastern North Dakota and northwestern Minnesota to reduce their thermostats to 60 degrees to conserve natural gas following explosion until natural gas supplies could be restored. The conservation request lasted for three days before suppliers determined it was no longer needed.

Yearly power outages and short-term propane or natural gas shortages will vary in magnitude and duration, most of them have been weather related generally caused by ice, wind, or a tornado. Most electrical or propane/natural gas outages occur between October 1 and June 1 however summer wind storms and tornados are also relatively common causes. Other causes for these events include accidents, vandalism, and terrorism. The outages are classified as major events by utility companies.

Winter storms (and early spring) are often the most difficult to manage and cause the most hardship for residents. Some of these storms in the past have been relatively minor and may only cause outages for 100 accounts or less that last less than 48 hours and the cost of restoration may be less than \$100,000. Other major winter storms may affect thousands of residents with outages lasting several weeks for some. The cost of system restoration following major storms has often been in the millions of dollars. The magnitude of these storms and the damage they cause varies widely and is extremely difficult to predict. Utility companies monitor when a storm is on the way but have difficulty predicting the extent of the damage.

Table 4.7.3A North Dakota (including Bottineau County) Shortage or Outage of Critical Materials or Infrastructure Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
State EO	North Dakota	1998	State Declared Critical Shortage of Livestock Feed	Unknown	Unknown

Source: North Dakota Department of Emergency Services, 2013.

4.7.4 Probability and Magnitude

Table 4.7.4A is a graphical representation of the range of events that can occur within the shortage or outage of critical materials or infrastructure hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the shortage or outage of critical materials or infrastructure hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.7.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				Statewide Loss of Food, Power, or Water
	<i>No local history</i>				
	<i>100 years</i>		Fuel Rationing	Extended Winter Power Outage	
	<i>50 years</i>	Short Lived Power Outages			
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

With a limited history of major events, the probability of future critical material or infrastructure shortages or outages can only be theorized. Generally, electric power outages are the most common and are often short-lived; electric outages do have the potential to cause significant problems. Gasoline shortages have also been problems in the past but have been limited to economic and social losses. Natural gas, propane, fuel oil, food, and water shortages are possible, but given a limited history of such, are somewhat less likely.

Possibly the most significant critical material or infrastructure shortages or outage scenario for Bottineau County is the loss of electricity for a week or more during a particularly cold winter spell. Without generators, an extended power outage could additionally lead to the loss of running water, sewer services, and the ability to heat buildings, which in turn may lead to pipe ruptures. Any equipment such as medical equipment, computers, and cell phones requiring power to run would eventually be incapacitated. Those facilities with generators would still be able to use appliances, equipment, and heating systems, however, community water and sewer services may not be available. Such a long term outage could lead to emergency sheltering and necessitate the activation of other emergency resources. Fuel and other material shortage would primarily affect the economy.

Outages can occur due to a series of events including, but not limited to: weather events, solar storms, hackers, and possibly nuclear electromagnetic pulse (NEMP) attacks.

Bottineau County is determined to be at a low risk for shortage or loss of critical materials/infrastructure with the only likely scenario being caused by a weather event.

4.7.5 Risk Assessment

Vulnerability Overview

Major storms that take bulk transmission lines down can affect the grid and cause outages covering a wide area. When this happens, outages often become lengthy and restoration becomes much more difficult. Most storms will cause damage to sub-transmission line and overhead distribution lines. The failure of sub-transmission lines causes the loss of substations which will extend outages because alternate sources are often not available and distribution feeders are also down. If the distribution feeders are underground they usually remain on-line as long as the substation has power.

The length of outages is often increased because of blocked roads, the need for snow removal or mud. It is often necessary to arrange for non-utility equipment to be available to pull utility trucks from pole to pole. Lodging and hot food can become a serious issue during these events. If the area has no power, restaurants and motels are forced to close and crews have to travel significant distances to find food and lodging. Some residents, both farm and business, will have stand-by generators but the majority of residents do not. Local utilities do not have generators available for use during these events.

Communications towers often have stand-by generators. However these towers are often located on a high point which is not necessarily near a well-traveled road. If the outage becomes extended the generator will often run out of fuel and it can be extremely difficult to gain access to the site.

Utilities use their own crews, contractors, mutual aid from other utilities in the county and occasionally crews from neighboring counties or states to restore the system during the emergency period. After power is restored to all customers, the remaining system restoration is completed by the Utilities crews and contractors.

Over the past 100 years, the population has become more dependent on the nation's infrastructure. Heat, running water, sanitation, communications, grocery stores, and pharmacies all require electricity, and without these services in the long term, the population and industry may suffer.

Propane, natural gas, fuel oil, and electricity are critical for heat, especially during the cold winter months. Approximately, 29 housing units in Bottineau County rely on natural gas for heat, 284 rely on propane, 724 rely on electric heat, and 372 rely on fuel oil/kerosene (American Community Survey 2008-2012). Personal and commercial food supplies may spoil during extended power outages. Telephone services are needed to call 911 for emergency assistance. Fresh water is needed for daily uses such as drinking and cleaning. Food processing similarly requires large amounts of water. Sewer is needed for sanitation. Grocery stores are the most common means of distributing the nation's food supply and pharmacies deliver medications. Each is important for health and safety. Without these services, emergency resources may be needed. Emergency supplies can often hold the populations over temporarily but may take some time before arriving, in which case, individuals may need to rely on their own personal supplies.

Agricultural areas of the county are also vulnerable to prolonged outage events as modern agricultural practices are reliant on energy; such as electric milking machines and irrigation pivots.

The economy depends heavily on utility and communication services. Electricity alone powers many systems used in day-to-day business. Businesses, such as restaurants, require electricity and water to operate. Without these services, many businesses could be shut down. Closed businesses and government offices essentially put the economy at a standstill until services are restored. Fuel shortages due to a power outage, low supplies, high prices, or transportation closures, could have lasting effects on everyone from the individual commuter to any business that ships inventory. Ultimately, the economy has a high dependence on utility or communications services.

Social values such as going from one place to another could be disrupted by a fuel shortage or transportation closure. Other social events may be cancelled due to the reliance on the utility services. Otherwise, ecological and historical values would remain unaffected.

To rate the risk of shortage or outage of critical materials or infrastructure, the ratings are based on population. The ratings are “low” for populations less than 4,000, “low-moderate” for populations of 4,001 to 9,000, “moderate” for populations of 9,001 to 16,000, “moderate-high” for populations of 16,001 to 27,000, and “high” for populations of greater than 27,001 based on the 2010 U.S. Census information. Determining the probability that a shortage or outage will occur in a given area is not practical or feasible. Bottineau County has a “low-moderate” risk to shortage or outage of critical materials or infrastructure due to the county population size (6,650).

Bottineau is the most vulnerable city in Bottineau County to shortage/outage of critical materials. Bottineau’s vulnerability is raised because it is the County Seat and has the highest population, along with Dakota State College, a hospital, numerous day care centers, and a nursing home. As a rule, vulnerable population facilities do not keep large amounts of resources in stock.

Table 4.7.5A Vulnerable Facilities Susceptible to Shortage or Outage of Materials

Facility Name	Type	Location	Population
St. Andrew’s Health Center	Hospital	Bottineau	25 Bed
St. Andrew’s Health Center Apartments	Living	Bottineau	14 Apartments
Good Samaritan Nursing Home	Living	Bottineau	65 Beds
Bottineau Public Schools (K-12)	School	Bottineau	651 Students
Westhope Public Schools (K-12)	School	Westhope	70 Students
Dakota College	College	Bottineau	169 On-Campus Students
Oak Manor	Living	Bottineau	30 Apartments
Janet Bechtold	Daycare	Bottineau	18 Children
Charlotte Bedlion	Daycare	Bottineau	18 Children
Heather Belcourt	Daycare	Bottineau	17 Children
Jodi Gustafson	Daycare	Bottineau	16 Children
Cindy Lagasse	Daycare	Bottineau	10 Children
Patty Monson	Daycare	Bottineau	18 Children
Louise Schneiderman	Daycare	Bottineau	9 Children
Rachael Stewart	Daycare	Bottineau	15 Children
Candace Trottier	Daycare	Westhope	12 Children
Samantha Werner	Daycare	Newburg	18 Children
Lupe Wuster	Daycare	Bottineau	15 Children
Ann Zorn	Daycare	Bottineau	18 Children
Building Blocks Learning Center	Center	Bottineau	65 Children
Sandra Anderson	Family Provider	Lansford	9 People

Lynette Dubois	Self-Declared	Bottineau	5 Children
Nancy Erickson	Self-Declared	Westhope	5 Children
Agnes Schumacker	Self-Declared	Westhope	5 Children

Loss Estimates

Since infrastructure outage is generally a secondary or cascading impact of other hazards, it is not possible to quantify estimated potential losses specific to this hazard due to the variables associated with affected population and duration of outages.

Electrical Providers

North Central Electric Cooperative and Ottertail Power service all of Bottineau County including the cities of: Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Souris, Overly, Westhope, and Willow City.

4.7.6 Critical Facilities in Hazard Prone Areas

Critical material or infrastructure outages do not often affect structures; however, an electric outage during winter could result in frozen and burst water pipes, causing water damage within the interiors of critical facilities. A propane, natural gas, or fuel oil outage could produce similar results. The failure of a sewer lift station could lead to a system back-up, and structures without sewer backflow valves could experience damages from sewer backwater; other structures could be flooded by overflowing sewage.

Utility or communication disruptions could also limit the ability to provide emergency services. For example, the medical facilities require electricity and water for certain types of medical equipment to work. Gas station pumps may not operate without electricity, and therefore, emergency vehicles may not have enough fuel during long term outages. Communications are vital to effective emergency operations and the lack of communication capabilities may significantly affect the abilities of emergency response organizations. Special needs facilities may need to move occupants to alternate locations due their dependence on local utilities.

Infrastructure supports utility and communication services. Therefore, outages or failures are often related to problems with the infrastructure. Minor damages or problems may indicate a short-term outage whereas large-scale damages may suggest a long term outage. Many services rely on other utilities to operate. For example, the water supply pumps and sewer lift stations both require electricity to continue operations. One or both may go down during long-term electric outages. Propane, oil, and gasoline refills require the transportation network to be open since deliveries are done by truck. This interdependency can lead to more complex utility outage problems.

4.7.7 Development in Identified Hazard Areas

Where future development occurs is not directly tied to increased shortages or outages of critical materials or infrastructure. Increased populations add to the challenges of managing a long-term shortage or outage but would not increase the damages necessarily.

4.7.8 Data Limitations and Other Key Documents

The data limitations related to the shortage or outage of critical material or infrastructure hazard include:

- Quantifying the type and length of shortages or outages that begin to cause significant problems
- Limited historical occurrence and related data prevents accurately estimating potential losses

Other key documents related to the Shortage or Outage of Critical Materials or Infrastructure include:

- North Dakota Emergency Operations Plan, Shortage of Critical Materials Annex
- North Dakota Energy Emergency Response Plan Update, N.D. State Energy Office, 2013
- NOAA Space Weather Prediction Center, <http://www.swpc.noaa.gov/NOAAscales/>
- NOAA A Profile of Space Weather, http://www.swpc.noaa.gov/primer/primer_2010.pdf

4.8 Severe Summer Weather

Including Tornadoes, Hail, Downbursts, Thunderstorm Winds, Lightning, and Extreme Heat

Frequency	Very Likely	Nearly a 100% chance in the next year
Impact	Negligible	<1% of jurisdiction affected
Risk Class	2	Minor
Seasonal Pattern	Summertime - May to September	
Duration	15 minutes to 24 hours, depends on whether the storm consists of heavy rains, hail, lightening, severe thunderstorms, tornadoes, heavy winds, and/or flash flooding.	
Speed of Onset	Minimal warning	

4.8.1 Description

Severe summer storms can result in loss of life, injuries, and damage to property and crops. Although thunderstorms affect relatively small areas when compared to other hazards such as winter storms, all thunderstorms are dangerous. Every thunderstorm produces lightning, which kills more people each year than tornadoes. Heavy rain from thunderstorms can lead to flash flooding. Strong winds, hail, and tornadoes are also dangers associated with some thunderstorms.

Thunderstorms develop across North Dakota when moisture in the atmosphere rises, usually from a front, unstable atmospheric conditions, or daytime ground heating, and cools higher in the atmosphere, condensing into rain droplets or ice crystals. The cloud grows as these conditions continue and the atmospheric instability allows. Lightning can be produced, with or without rain, as a charge builds up in the cloud. With the right atmospheric conditions, updrafts and downdrafts form in the thunderstorm structure. Strong updrafts and downdrafts can produce hail, damaging downbursts, and even tornadoes.

The National Weather Service estimates that over 100,000 thunderstorms occur each year in the United States; approximately 10 percent of those storms are classified as severe. A severe thunderstorm is defined by the National Weather Service as a thunderstorm that produces wind gusts at or greater than 58 mph (50 kts), hail 1 inch or larger in diameter, and/or tornadoes. These criteria represent thresholds where significant damages can occur. Strong winds and tornadoes can take down trees, damage structures, tip high profile vehicles, and create high velocity flying debris. Large hail can damage crops, dent vehicles, break windows, and injure or kill livestock, pets, and people.

The Cumulus Stage

The cumulus stage occurs when thunderstorm development begins. At this stage, the storm consists only of upward-moving air currents called updrafts. These updrafts reach heights of around 20,000 feet above the ground, but the base of the storm may lower, as moisture becomes more plentiful. As a thunderstorm develops, towering cumulus clouds indicate rising air. There is usually little rain during this stage and only occasional lightning.

The Mature Stage

The mature stage is the strongest and most dangerous stage of a storm's life cycle. As the storm matures, the clouds have a black or dark green appearance. Hail, heavy rain, frequent lightning, strong winds, and tornadoes are most likely to occur during this phase, lasting an average of 10 to 20 minutes. At this stage, the storm contains both upward and downward moving air currents (updrafts and downdrafts) with precipitation in the downdraft areas. These updrafts and downdrafts can reach velocities of 170 mph. When the cool downdraft hits the ground, it spreads out and forms a gust front, which may include damaging wind called a downburst. The updraft also causes the top of the storm to spread out.

The Dissipating Stage

In the dissipating stage, the precipitation and downdraft dominate the storm and weaken the updraft. As the gust front moves away from the storm, the inflow of energy into the storm is cut off. As the thunderstorm dissipates, rainfall may decrease in intensity, but lightning and strong winds remain a danger.

Tornadoes

Tornadoes form when the right amount of shear is present in the atmosphere and causes the updraft and downdraft of a thunderstorm to rotate. A funnel cloud is the rotating column of air extending out of a cloud base, but not yet touching the ground. The funnel cloud does not become a tornado until it touches the ground. Once in contact with the surface, it can create great damage over a small area. In 1971, Dr. Theodore Fujita developed the Fujita tornado damage scale to categorize various levels of tornado damage. In 2006, enhancements to this scale resulted in more accurate categorizations of damage and the associated wind speeds. Both scales are shown in Table 4.8.1A.

Figure 4.8.1A Tornado Stages



Development Stage



Mature State (F1)



Dissipation Stage

Source: National Weather Service, 2007

Table 4.8.1B Tornado Scales

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

Source: Storm Prediction Center, 2008a.

Hail

Hail develops when a supercooled droplet collects a layer of ice and continues to grow, sustained by the updraft. Once the hail stone cannot be held up any longer by the updraft, it falls to the ground. Hail up to the size of baseballs has been reported in Bottineau County. Nationally, hailstorms cause nearly \$1 billion in property and crop damage annually, as peak activity coincides with peak agricultural seasons. Severe hailstorms also cause considerable damage to buildings and automobiles, but rarely result in loss of life.

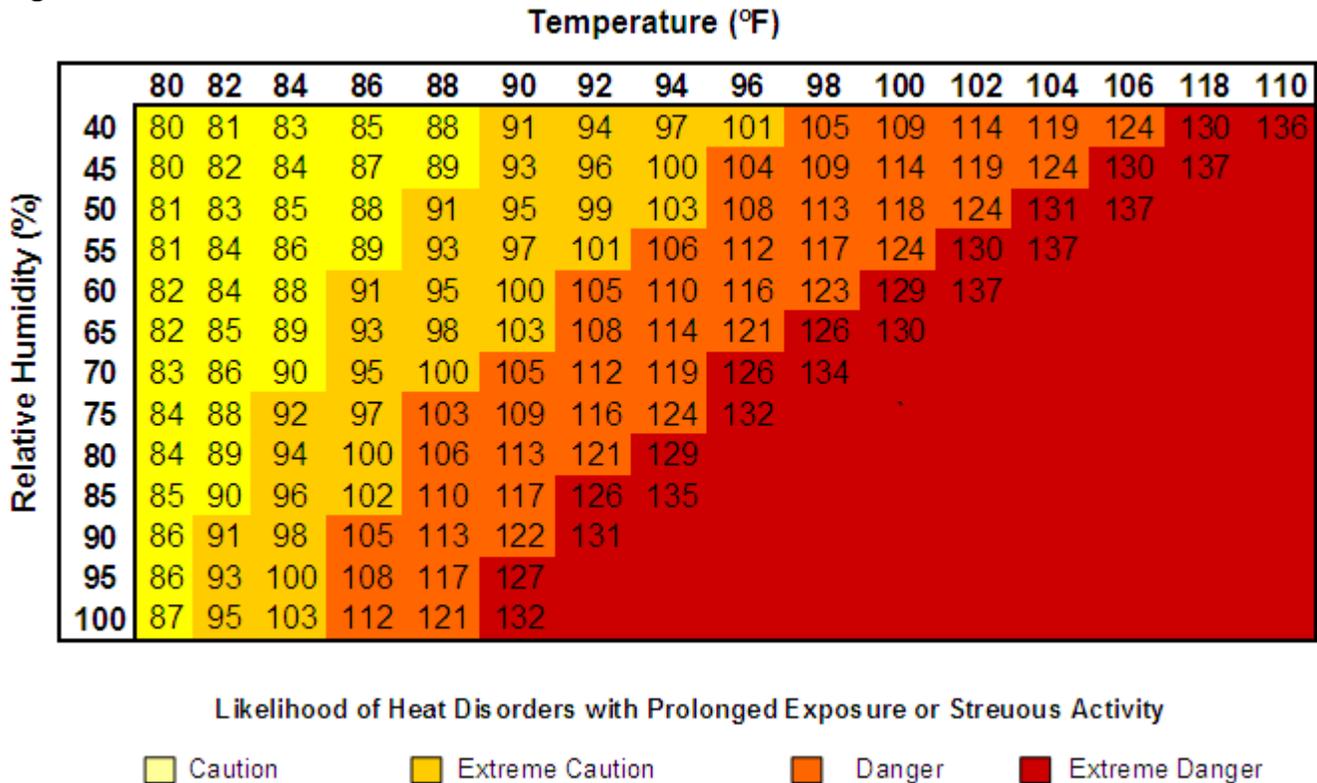
Extreme Heat

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died.

Heat disorders generally have to do with a reduction or collapse of the body’s ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body’s inner core begins to rise and heat-related illness may develop. Elderly persons, small children, chronic invalids, those on certain medications or drugs, and persons with weight and alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where moderate climate usually prevails.

Figures 4.8.1 and 4.8.2 show the Heat Index (HI) as a function of heat and relative humidity. The Heat Index describes how hot the heat-humidity combination makes it feel. As relative humidity increases, the air seems warmer than it actually is because the body is less able to cool itself via evaporation of perspiration. As the HI rises, so do health risks. When the HI is 90°F, heat exhaustion is possible with prolonged exposure and/or physical activity. When it is 90°-105°F, heat exhaustion is probable with the possibility of sunstroke or heat cramps with prolonged exposure and/or physical activity. When it is 105°-129°F, sunstroke, heat cramps or heat exhaustion is likely, and heatstroke is possible with prolonged exposure and/or physical activity. When it is 130°F and higher, heatstroke and sunstroke are extremely likely with continued exposure. Physical activity and prolonged exposure to the heat increase the risks.

Figure 4.8.1C Heat Index



Note: Since HI values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

Figure 4.8.2 Possible Heat Disorders by Heat Index Level

Heat Index	Category	Possible heat disorders for people in high risk groups
130°F or higher	Extreme Danger	Heatstroke risk extremely high with continued exposure.
105° - 129°F	Danger	Sunstroke, Heat Cramps and Heat Exhaustion likely, Heatstroke possible with prolonged exposure and/or physical activity.
90° - 105°F	Extreme Caution	Sunstroke, Heat Cramps and Heat Exhaustion possible with prolonged exposure and/or physical activity.
80° - 90 °F	Caution	Fatigue possible with prolonged exposure and/or physical activity.

The NWS has in place a system to initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. A common guideline for the issuance of excessive heat alerts is when the maximum daytime high is expected to equal or exceed 105°F and a nighttime minimum high of 80°F or above is expected for two or more consecutive days. The NWS office in Bismarck can issue the following heat-related advisory as conditions warrant.

- **Excessive Heat Outlook:** is issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information from the Heat Index forecast map for the contiguous United States to those who need considerable lead time to prepare for the event, such as public utilities, emergency management and public health officials.
- **Excessive Heat Watch:** is issued when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A Watch is used when the risk of a heat wave has increased, but its occurrence and timing is still uncertain. A Watch provides enough lead time so those who need to prepare can do so, such as cities that have excessive heat event mitigation plans.
- **Excessive Heat Warning/Advisory:** are issued when an excessive heat event is expected in the next 36 hours. These products are issued when an excessive heat event is occurring, is imminent, or has a very high probability of occurring. The warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.

Downbursts and Strong Winds

Downburst winds, which can cause more widespread damage than a tornado, occur when air is carried into a storm's updraft, cools rapidly, and comes rushing to the ground. Cold air is denser than warm air, and therefore, wants to fall to the surface. On warm summer days, when the cold air can no longer be supported up by the storm's updraft, or an exceptional downdraft develops, the air crashes to the ground in the form of strong winds. These winds are forced horizontally when they reach the ground and can cause significant damage. These types of strong winds can also be referred to as straight-line winds. Downbursts with a diameter of less than 2.5 miles are called microbursts and those with a diameter of 2.5 miles or greater are called macrobursts. A derecho, or bow echo, is a series of downbursts associated with a line of thunderstorms. This type of phenomenon can extend for hundreds of miles and contain wind speeds in excess of 100 mph.

Straight-line winds are responsible for most thunderstorm wind damage. During the summer in the western states, thunderstorms often produce little rain but very strong wind gusts and dust storms. Downbursts can be extremely dangerous to aviation. Damage attributed to tornadoes is frequently caused by straight-line winds from a downburst. Downbursts can produce a "roaring" sound and damage similar to a tornado. These strong winds can damage trees, blow vehicles off the road, break windows, down power lines, damage roofs and fences, and cause other structural damages. Individuals caught outside are also at risk of injury from blowing dust and debris.

Strong winds can also occur outside of tornadoes and severe thunderstorms. These winds typically develop with strong pressure gradients and gusty frontal passages. The closer and stronger two systems (one high pressure, one low pressure) are, the stronger the pressure gradient, and therefore, the stronger the winds are.

Lightning

Although not considered severe by National Weather Service definition, lightning and heavy rain can also accompany thunderstorms. Lightning develops when ice particles in a cloud move around, colliding with other particles. These collisions cause a separation of electrical charges. Positively charged ice particles rise to the top of the cloud and negatively charged ones fall to the middle and lower sections of the cloud. The negative charges at the base of the cloud attract positive charges at the surface of the Earth. Invisible to the human eye, the negatively charged area of the cloud sends a charge called a stepped leader toward the ground. Once it gets close enough, a channel develops between the cloud and the ground. Lightning is the electrical transfer through this channel. The channel rapidly heats to 50,000 degrees Fahrenheit and contains approximately 100 million electrical volts. The rapid expansion of the heated air causes thunder. (National Weather Service, 2008a)

4.8.2 Geographic Location

Summer storms are of the scale and pattern that the science is not quite sophisticated enough to identify what areas of the county are at greater risk of occurrence. Therefore, all areas of the county are assumed to have the same severe thunderstorm and strong wind risk countywide. Generally, the urban areas have the potential to sustain more damages due the increased exposure to hazards.

4.8.3 Previous Occurrences

Reports of severe thunderstorms and tornadoes are collected from trained spotters by the local National Weather Service (NWS) office in Bottineau. These records are archived by the National Climatic Data Center. Since official records can only indicate events that have been reported to the National Weather Service, events are often underreported in rural area and areas lacking trained spotters.

Tornadoes

Since 1950, 30 tornado events have been recorded in Bottineau County. The strongest tornado reported in the county was an EF3 on the Enhanced Fujita scale. Table 4.8.3A lists the damaging tornadoes that have occurred in the county since 2007.

Table 4.8.3A Damaging Tornadoes

Location	Date	Strength
Lake Metigoshe	07/07/2008	EFO

Source: <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=38%2CNORTH+DAKOTA>

Bottineau County is not considered prone to tornadoes as it is so far north compared to tornado alley. Nevertheless, there have been 30 reports of tornadoes since 1950, but only one has been above a F2 category. This was an F3 that occurred on June 26th, 1986 5 miles NW of Bottineau. The path of the tornado was 8 miles long and 3 miles wide at times. Only a dog was killed during this event. Bottineau County has not had any significant tornado since then, a 30 year span. Before official records were kept in 1950, a tornado hit northern Antler, ND on August 20th, 1911 at 6:30 in the evening. In total, 4 people were killed and 22 were injured; damage estimates of over \$100,000 were reported (Over \$2.5 million in 2015).



<http://antlernd.com/styled-4/styled-10/index.html>

Hail

Since 1950, 64 days have been reported with severe hail reports (3/4 inches or greater) in Bottineau County. Table 4.8.3B lists the reports of hail since 2007.

Table 4.8.3B Hail Reports since January 1, 2007

Location	Date	Hail Size
LANSFORD	5/21/2007	0.75
LANSFORD	5/21/2007	1

MAXBASS	6/22/2007	1.75
SOURIS	6/22/2007	2
SOURIS	6/22/2007	0.88
NEWBURG	6/25/2007	0.75
LANDA	6/25/2007	0.88
SOURIS	6/25/2007	0.75
WESTHOPE	6/18/2008	0.88
WESTHOPE	6/18/2008	0.75
LANDA	6/18/2008	1
WESTHOPE	6/18/2008	1.25
BOTTINEAU	6/18/2008	0.88
KRAMER	6/18/2008	0.75
LANSFORD ARPT	8/2/2008	0.88
FORFAR SIDING	8/2/2008	1
LANSFORD	8/2/2008	0.75
LANSFORD ARPT	8/2/2008	1
ROTH	6/18/2009	0.75
KRAMER	4/13/2010	0.88
WESTHOPE	7/3/2010	1
BOTTINEAU	7/20/2010	1
KRAMER	6/2/2011	1.5
BOTTINEAU	6/2/2011	0.88
BOTTINEAU	6/2/2011	0.75
BOTTINEAU	6/2/2011	0.88
BOTTINEAU ARPT	6/2/2011	0.88
BOTTINEAU	6/2/2011	1.75
OMEMEE	6/2/2011	0.75
BOTTINEAU ARPT	6/2/2011	1.25
MAXBASS	6/25/2011	1.5
ECKMAN	6/25/2011	1
MAXBASS	6/25/2011	1
WILLOW CITY	6/25/2011	0.75
LANSFORD	5/22/2012	1
LANSFORD	5/22/2012	1
MAXBASS	5/22/2012	0.75
ANTLER	6/13/2012	1
WILLOW CITY	6/17/2012	0.75
WILLOW CITY	7/2/2012	1
ANTLER	6/21/2013	1
BOTTINEAU	8/30/2013	1.25
BOTTINEAU ARPT	8/30/2013	0.75
BOTTINEAU	8/30/2013	1
BOTTINEAU ARPT	8/30/2013	1.25

Source: National Climatic Data Center, 2015

Extreme Heat History

The National Climatic Data Center has never recorded an extreme heat event in Bottineau County since the NOAA has been keeping records since 1950.

Severe Thunderstorm Winds / Downbursts

Since 1950, 38 severe thunderstorm wind reports (58 mph or greater) have been recorded in Bottineau County. Table 4.8.3C lists the reports of severe thunderstorm winds causing damages since 2007.

Table 4.8.3C Severe Thunderstorm Wind Reports Causing Damage

Location	Date	Wind Speed	Damage Reported
Kramer	6/26/2007	52	Branches, Sticks down
Lansford	7/31/2007	74	Quonset torn from foundation. Trees Down. 2000 Gallons of oil spilled
Newburg	7/31/2007	70	One foot diameter trees downed. Knocked over grain bin and damaged auger
Roth	6/18/2009	52	Branches, Sticks down
Bottineau	5/29/2010	61	Damage on West side of Bottineau. Grain Bins knocked over. Transmission Tower knocked down along with several large trees.
Willow City	6/25/2011	74	Trees blown over, large barn blown down.
Willow City	6/25/2011	70	Uprooted numerous trees, blew down utility poles.
Bottineau	6/9/2012	56	Winds of 65mph with minor tree damage.
Lansford	6/26/2012	68	No Reports of Damage
Antler	6/21/2013	52	Large Hail accompanied by strong winds
Antler	7/13/2013	50	No Reports of Damage
Antler	7/13/2013	52	Strong winds blew down small tree branches
Bottineau	7/13/2013	52	Heavy Rain accompanied the strong winds
Bottineau	8/30/2013	52	Heavy Rain accompanied the strong winds
Bottineau ARP	8/30/2013	52	Heavy Rain accompanied the strong winds
Bottineau	8/30/2013	52	Heavy Rain accompanied the strong winds

Source: <http://www.ncdc.noaa.gov/stormevents/choosedates.jsp?statefips=38%2CNORTH+DAKOTA>

FEMA DECLARED DISASTERS

Lightning

Bottineau County has only had one lightning event that caused damage since 1950 which occurred on July 24th, 1997 two miles East of Newburg. The bolt struck an oil tank which burned to the ground.

Non-Thunderstorm Strong Winds

Since 1950, there has been no non-thunderstorm wind events recorded in Bottineau County.

Flash Flood and Significant Rain Event

Severe Summer Weather events may also cause a large amount of rain in very little time; however, these occurrences were discussed in the section of Flooding (4.4).

Table 4.8.3D Bottineau County Summer Storm Declared Disasters and Emergencies

Declaration	Location	Date	Other Information	Casualties	Damages
None					

4.8.4 Probability and Magnitude

Table 4.8.4A is a graphical representation of the range of events that can occur within the summer storm hazard. Generally, the more frequent events have a low impact, and the high impact event occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the summer storm hazard. The Introduction to this risk assessment chapter defines the impact categories and provides additional information.

Table 4.8.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				
	<i>No local history</i>				EF5 Tornado in Urban Area
	<i>100 years</i>				
	<i>50 years</i>	Damaging Lightening Strike	Widespread Hail and Wind Damage	Strong Tornado in a Community	
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

Generally, the summer months are when the probability of severe thunderstorms in Bottineau County is highest, but some have been recorded as early as May and as late as October. High wind events can occur during any time of year. Table 4.8.4B shows a summary of the summer storm events.

Table 4.8.4B Summer Storm Historical Summary

Event Type	Bottineau County
Reported Tornadoes	30 events (1950-2014) Highest Magnitude: EF3 1 reported event since 2007
Reported Severe Hail	64 events (1950-2014) Highest Magnitude: 2.75" 45 reported events since 2007
Reported Extreme Heat Events	No events (1950-2014)
Reported Severe Thunderstorm Winds	51 events (1950-2014) Highest Magnitude: 90 mph 16 damaging events since 2007
Reported Damaging Lightning Strikes	1 damaging events since 1950
Reported Non-thunderstorm Wind	0 damaging events since 1950

Source: National Climatic Data Center, 2013.

Based on the historical record, the following can be expected on average in Bottineau County:

- In an average year, 0-1 tornado.
- In an average year, 1-2 severe hail events.
- In an average year, 2-4 severe thunderstorm wind events.
- In an average year, 0-1 damaging lightning event.
- In an average year, 0-1 strong non-thunderstorm wind event.

Reported summer storm events over the past fifteen years provide an acceptable framework for determining the magnitude of such storms that can be expected and should be planned for. For tornadoes, the maximum intensity that has been reported in Bottineau County is an EF3 and even an EF5 is possible. The Federal Emergency Management Agency places this region in Zone II (160 mph) for structural wind design. (Federal Emergency Management Agency, 2004) Hail sizes up to 4.5 inches, or larger than softballs, can be expected based on historical reports in the region. This size hail and even smaller sizes can damage structures, break windows, dent vehicles, ruin crops, and kill or injure people and livestock. Non-tornadic, thunderstorm and non-thunderstorm winds over 100 mph should also be planned for. These types of winds can remove roofs, move mobile homes, topple trees, take down utility lines, and destroy poorly-built or weak structures.

4.8.5 Risk Assessment

Vulnerability Overview

With the entire county at risk from summer storms, estimates of damages are hard to determine. Realistically, since all types of summer storms occur and cause damages in Bottineau County, the greatest determining factor is if the storm hits a populated area or not. Using the Northwood tornado from Grand Forks County as the benchmark, as it is the most recent tornado to hit a North Dakota town; over 400 structures can be damaged causing \$50 million in damages during only one event. Vehicles damaged by hail or falling debris could be additional losses to individuals, businesses, and government.

The Storm Prediction Center has developed damage indicators to be used with the Enhanced Fujita Scale for different types of buildings. Some of the indicators for different building types are shown in Tables 4.8.5A, 4.8.5B, and 4.8.5C.

Table 4.8.5A One and Two Family Residences

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	53-80 mph (65 mph)
Loss of roof covering material (<20%), gutters, and/or awning; loss of vinyl or metal siding	63-97 mph (79 mph)
Broken glass in doors and windows	79-114 mph (96 mph)
Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward; failure of porch or	81-116 mph (97 mph)

carport	
Entire house shifts off foundation	103-141 mph (121 mph)
Large sections of roof structure removed, most walls remain standing	104-142 mph (122 mph)
Exterior walls collapsed	113-153 mph (132 mph)
Most walls collapsed, except small interior rooms	127-178 mph (152 mph)
All walls	142-198 mph (170 mph)
Destruction of engineered and/or well-constructed residence; slab swept clean	165-220 mph (200 mph)

Source: Storm Prediction Center, 2013a.

Table 4.8.5B Single Wide Manufactured Homes

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

Source: Storm Prediction Center, 2013a.

Table 4.8.5C Small Barns and Farm Outbuildings

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	53-78 mph (62 mph)
Loss of wood or metal roof panels	61-91 mph (74 mph)
Collapse of doors	68-102 mph (83 mph)
Major loss of roof panels	78-110 mph (90 mph)
Uplift or collapse of roof structure	77-114 mph (93 mph)
Collapse of walls	81-119 mph (97 mph)
Overturning or sliding of entire structure	83-118 mph (99 mph)
Total destruction of building	94-131 mph (112 mph)

Source: Storm Prediction Center, 2013a.

Table 4.8.5D Small Retail Buildings

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	54-81 mph (65 mph)
Loss of roof covering (<20%)	65-98 mph (78 mph)

Broken glass in windows and doors	72-103 mph (86 mph)
Uplift of roof decking; significant loss of roof covering (>20%)	81-119 mph (98 mph)
Canopies or covered walkways destroyed	83-114 mph (98 mph)
Uplift or collapse of entire roof structure	101-140 mph (19 mph)
Collapse of exterior walls; closely spaced interior walls remain standing	120-159 mph (138 mph)
Total destruction of entire building	143-193 mph (167 mph)

Source: Storm Prediction Center, 2013a.

Since structures are vulnerable to tornadoes and strong winds, those inside them are also at risk. The National Weather Service office in Bismarck warns for tornadoes, severe thunderstorms, and high winds events for Bottineau County. Meteorologists use a variety of tools such as Doppler radar and weather spotters to predict these hazardous events and issue warnings that are broadcast over NOAA Weather Radio and other media. Therefore, the population may have some lead time to take precautions, if they receive the warning. Generally, these warnings recommend that people move to a pre-designated shelter or a basement. If not available, interior rooms or hallways on the lowest floor away from windows or under a sturdy piece of furniture is recommended. Mobile homes, even if tied down and automobiles are not safe places. Bottineau County has a low ratio of mobile homes. According to the United States Census Bureau, there are 1,493 housing units in the county with 53 of these being mobile homes. With 1.3 people living in each housing unit this puts 69 people living at enhanced risk from tornadoes and strong winds. The mobile homes are scattered throughout the county with equal vulnerability among the cities. Besides structure failure, wind-driven projectiles and shattered glass can injure or kill occupants. Lightning strikes can occur with little to no warning, causing injury or death to those in the area.

Table 4.8.5E Structural Build of Bottineau County Residents' Home

	Wood Frame	Wood/Partial Brick	Steel	Other
Urban Residential Structures	99%	<1%	0%	<1%
Rural Residential Structures	99%	<1%	<1%	<1%
Rural Tax Exempt Structures	99%	<1%	<1%	<1%

Source: Estimates based on conversation with the Bottineau County Tax Equalization Director

Table 4.8.5F Estimated Manufactured Homes (not affixed to the ground) Count in Bottineau County

Location	Count
Urban Residential Structures	100
Rural Residential Structures	25

Source: Bottineau County Tax Equalization Director

Table 4.8.5G Vulnerable Populations

Facility Name	Type	Location	Population
St. Andrew's Health Center	Hospital	Bottineau	25 Bed

St. Andrew’s Health Center Apartments	Living	Bottineau	14 Apartments
Good Samaritan Nursing Home	Living	Bottineau	65 Beds
Bottineau Public Schools (K-12)	School	Bottineau	651 Students
Westhope Public Schools (K-12)	School	Westhope	70 Students
Dakota College	College	Bottineau	169 On-Campus Students
Oak Manor	Living	Bottineau	30 Apartments
Janet Bechtold	Daycare	Bottineau	18 Children
Charlotte Bedlion	Daycare	Bottineau	18 Children
Heather Belcourt	Daycare	Bottineau	17 Children
Jodi Gustafson	Daycare	Bottineau	16 Children
Cindy Lagasse	Daycare	Bottineau	10 Children
Patty Monson	Daycare	Bottineau	18 Children
Louise Schneiderman	Daycare	Bottineau	9 Children
Rachael Stewart	Daycare	Bottineau	15 Children
Candace Trottier	Daycare	Westhope	12 Children
Samantha Werner	Daycare	Newburg	18 Children
Lupe Wuster	Daycare	Bottineau	15 Children
Ann Zorn	Daycare	Bottineau	18 Children
Building Blocks Learning Center	Center	Bottineau	65 Children
Sandra Anderson	Family Provider	Lansford	9 People
Lynette Dubois	Self-Declared	Bottineau	5 Children
Nancy Erickson	Self-Declared	Westhope	5 Children
Agnes Schumacker	Self-Declared	Westhope	5 Children

Source: Bottineau County Emergency Manager

The townships’ population is mainly farmers who are deemed to be self-sufficient should a severe summer storm electrical power outage occur. Most farmers have standby generators to provide electricity to their homes and farming operation during a summer storm power outage.

Incorporated cities in Bottineau County that lack a facility containing vulnerable populations include Antler, Gardena, Kramer, Overly, Souris and Willow City. Despite not having a facility, these communities do contain vulnerable populations such as individuals ages 18 and under, and 65 and over.

Large hail is always a threat to the agricultural community. Hail can damage crops and injure or kill livestock. A severe hail event that substantially damages an agricultural area could have significant economic impacts. Similarly, structures can be damaged by hail, so losses can easily total in the millions of dollars in urban areas. Strong winds and tornadoes could have similar impacts. Extreme heat events can wither crops and kill livestock.

To refine and assess the relative vulnerability of each North Dakota county to severe summer storm events, ratings were assigned to pertinent factors that were examined at the county level. These factors include: social vulnerability index, prior events, prior annualized property damage, building exposure valuation,

population density, livestock exposure, crop exposure, and annualized crop loss. Tornado also included mobile home density, and lightning did not include annualized crop loss. A rating value of 1-10 was assigned to the data obtained for each factor and then weighted equally and factored together to obtain overall vulnerability scores for each comparison and to determine the most vulnerable counties. The Social Vulnerability Index normally ranges from 1-5. To give the Social Vulnerability Index the same weight as the other factors, the numbers were multiplied by two. Overall vulnerability scores were sorted into rankings from low, low-moderate, moderate, moderate-high, and high. Table 4.8.5H summarizes the calculated ranges applied to determine the overall vulnerability ranking based on the scores which varied among individual hazards.

Table 4.8.5H Rankings for Overall Severe Summer Weather Vulnerability

Hazard	Low	Low-Moderate	Moderate	Moderate-High	High
Tornado	14-22	23-31	32-40	41-49	50-59
Hail	15-22	23-30	31-38	39-46	47-55
Extreme Heat	14-19	20-25	26-31	32-37	38-42
Thunderstorm Winds	10-17	18-25	26-33	34-41	42-50
Lightening	12-17	18-23	24-29	30-36	37-43

Table 4.8.5I summarizes the vulnerability ranking for each hazard to determine the overall summer storm vulnerability ranking for Bottineau County. The numbers provide low-moderate rating across for Bottineau County which coincides with its data analysis that there is a potential for severe summer weather yet the county has been fortunate to not suffer many significant events.

Table 4.8.5I Bottineau County Severe Summer Weather Vulnerability

Tornado	Hail	Extreme Heat	Thunderstorm Winds	Lightening	Overall Vulnerability Ranking
Low-Moderate	Low-Moderate	Low-Moderate	Low-Moderate	Low-Moderate	Low-Moderate

Loss Estimates

Loss estimates are based on data from National Climatic Data Center and the Risk Management Agency. Based on NCDC event narratives, typical damages from severe summer weather include livestock injury and death; crop loss; downed power lines and power poles; damage to roofs, windows, siding, gutters, outbuildings, and farm equipment; vehicle accidents; damage to cars apart from accidents (especially in the case of tornadoes and hail); and human fatalities and injuries.

Total combined damages from all six summer storm hazards in National Climatic Data Center records for Bottineau County included an estimated \$4,214,000 in property damage since 1950. Crop loss figures were based on crop insurance policies paid, which equaled \$201,170,387 from the years 1995 through 2012.

<http://farm.ewg.org/cropinsurance.php?fips=38009&summpage=SUMMARY>

Table 4.8.5J Severe Summer Storm Loss Estimates by Hazard

Event Type	Bottineau County
<i>Reported Tornadoes</i>	\$ 3,380,000 property damage
<i>Reported Hail</i>	\$10,000 property damage
<i>Reported Extreme Heat Events</i>	\$0 property damage
<i>Reported Severe Thunderstorm Winds</i>	\$859,000 property damage
<i>Damaging Lightning Strikes</i>	\$15,000 property damage
<i>Reported Strong Non-Thunderstorm Winds</i>	\$0 property damage

Source: National Climatic Data Center, 2014.

4.8.6 Critical Facilities in Hazard Prone Areas

The Storm Prediction Center has developed damage indicators to be used with the Enhanced Fujita Scale for different types of buildings. State-owned buildings and critical facilities are categorized and shown in Table 4.8.6A and Table 4.8.6B.

Table 4.8.6A Institutional Buildings

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	59-88 mph (72 mph)
Loss of roof covering (<20%)	72-109 mph (86 mph)
Damage to penthouse roof and walls, loss of rooftop HVAC equipment	75-111 mph (92 mph)
Broken glass in windows or doors	78-115 mph (95 mph)
Uplift of lightweight roof deck and insulation, significant loss of roofing material (>20%)	95-136 mph (114 mph)
Façade components torn from structure	97-140 mph (118 mph)
Damage to curtain walls or other wall cladding	110-152 mph (131 mph)
Uplift of pre-cast concrete roof slabs	119-163 mph (142 mph)
Uplift of metal deck with concrete fill slab	118-170 mph (146 mph)
Collapse of some top story exterior walls	127-172 mph (148 mph)
Significant damage to building envelope	178-268 mph (210 mph)

Source: Storm Prediction Center, 2013a.

Table 4.8.6B Metal Building Systems

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	54-83 mph (67 mph)

Inward or outward collapsed of overhead doors	75-108 mph (89 mph)
Metal roof or wall panels pulled from the building	78-120 mph (95 mph)
Column anchorage failed	96-135 mph (117 mph)
Buckling of roof purlins	95-138 mph (118 mph)
Failure of X-braces in the lateral load resisting system	118-158 mph (138 mph)
Progressive collapse of rigid frames	120-168 mph (143 mph)
Total destruction of building	132-178 mph (155 mph)

Source: Storm Prediction Center, 2013a.

Many of the critical and special needs facilities, although adequate for most events may not be able to withstand 160-200 mph tornado or severe thunderstorm winds, as recommended by the Federal Emergency Management Agency. (Federal Emergency Management Agency, 2004) Most structures should be able to provide adequate protection from hail, but the structures could suffer broken windows and dented exteriors. Even if a structure performs well in the high winds, flying debris and falling trees may damage the building. Table 4.8.6C shows the damage indicators for a typical school building.

Table 4.8.6C School Building

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

Source: Storm Prediction Center, 2013a.

Above ground infrastructure, namely overhead power lines, communications towers and lines, and structures, are very susceptible to summer storms. High winds and falling trees can damage this type of infrastructure and disrupt services. Therefore, even an indirect hit by a tornado or strong winds could disrupt regional electricity and possibly telephone services. Table 4.8.6D shows the Enhanced Fujita Scale Damage Indicators for electric transmission lines.

Table 4.8.6D Electrical Transmission Lines

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	70-98 mph (83 mph)

Broken wood cross member	80-114 mph (99 mph)
Wood poles leaning	85-130 mph (108 mph)
Broken wood poles	98-142 mph (118 mph)
Broken or bent steel or concrete poles	115-149 mph (138 mph)
Collapsed metal truss towers	116-165 mph (141 mph)

Source: Storm Prediction Center, 2013a.

Should an above ground facility such as a water treatment facility or a sewer lift station be damaged, water and sewer services could also be disrupted. Debris may also block roadways making transportation and commerce difficult if not impossible.

Table 4.8.6E shows the entity provided electric power to incorporated communities and rural areas in Bottineau County. This information is necessary for the county and its communities to understand its vulnerability to severe summer storms. North Central Electric Cooperative and Ottertail Power Company each have unique vulnerabilities in their infrastructure. When an incident of the hazard occurs, community leaders and public officials will know which entity to contact to restore power and limit losses. If a prolonged outage occurred or other issues resulting from an incident of the hazard, the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City have adequate shelters identified to shelter their populations should the need arise.

Table 4.8.6E Electrical Providers

	North Central Electric Cooperative	Ottertail Power Company
Antler		X
Bottineau		X
Gardena		X
Kramer		X
Landa		X
Lansford		X
Maxbass		X
Newburg		X
Overly	X	
Souris		X
Westhope		X
Willow City		X
Rural Bottineau County	X	X

4.8.7 Development in Identified Hazard Areas

The summer storm risk is assumed to be uniform countywide. Therefore, the location of development does not increase or decrease the risk. New development constructed utilizing current building code standards may have a reduced risk of structural damages during a tornado or high wind event. The city of Bottineau

is the only incorporated city in Bottineau County that enforces building codes. With advances in building techniques, newer structures are built to integrities to withstand severe summer storms and strong winds; mobile homes, however, continue to be the exception.

4.8.8 Data Limitations and Other Key Documents

The data limitations related to the summer storm hazard include:

- Summer storm events are only recorded if observed and reported to the National Weather Service
- The rural nature of some areas in the county leaves them without weather spotters
- Only a limited number of weather observing stations are located in the county
- Historic lightning data is expensive to purchase for analysis

Other key documents related to the Summer Storm hazard include:

- North Dakota Emergency Operations Plan, Severe Storms Annex

4.9 Transportation Accident

Including Vehicular, Railway, and Aircraft Accidents

Frequency	Possible	1-10% Probability in the next year
Impact	Moderate	10-25% of the Jurisdiction affected
Risk Class	3	Moderate Risk Requires Fast Action Address via SOP's
Seasonal Pattern	None	
Duration	Situation dependent, average: 1-6 hours; Could be weeks	
Speed of Onset	Minimal warning	

4.9.1 Description

A transportation accident, for the purposes of this plan, is any large-scale vehicular, railroad, or aircraft accident involving mass casualties. Mass casualties can be defined as an incident resulting in a large number of deaths and/or injuries that reaches a magnitude that overwhelms the ability of local resources to adequately respond. In most disasters, death and injury represent one of the effects of the hazard while in transportation accidents, mass casualties are often the primary impact and focus of the event.

Federal and state highways, county and city roadways, active railways, airports, and air traffic routes all pass through Bottineau County. Major roadways in the county include US Highway 83 and State Highways 5, 14, 43, 60, and 256. Multi-vehicular accidents are many times related to weather, either obscuring the vision of drivers or hindering their control of a vehicle.

Rail accidents are usually caused by the collision of the train with a vehicle at a crossing or an equipment failure leading to a derailment. However, BNSF railroad traffic has increased through Bottineau County increasing the probability of a train derailment, mainly due to oil development in the Bakken Oil Field of western North Dakota which has been on a steady climb and is forecasted to continue to do so. The lack of pipelines to carry the oil to refineries in the eastern United States requires the oil to be transported by rail. In addition to the traditional cargo of general freight, grain, and coal; crude oil has become a major source of rail traffic.

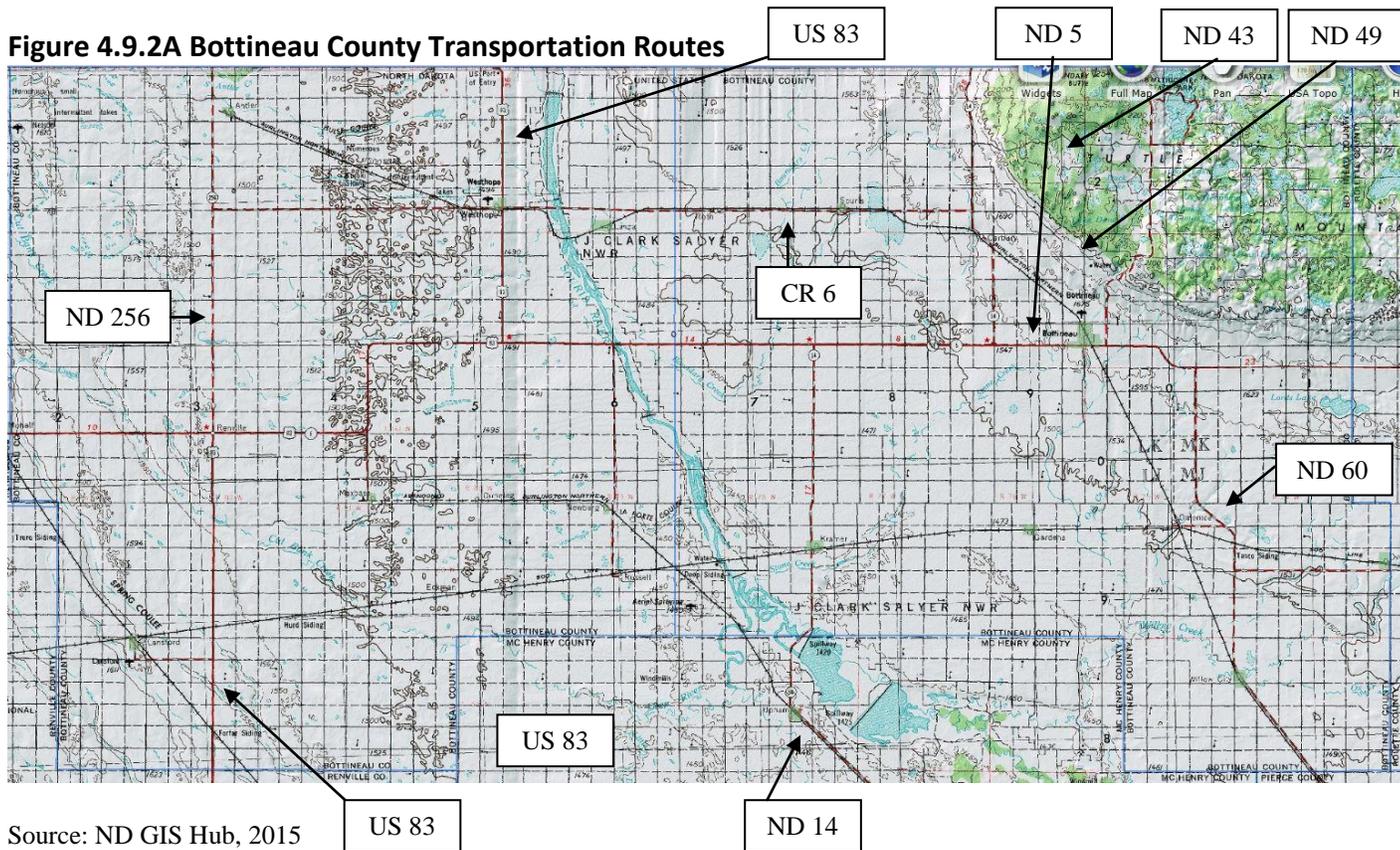
With this number of trains, additional exposure for derailment and railroad crossing accidents exists. BNSF is seeing growth in North Dakota and are adding capacity along their railroad routes for that growth, including through Bottineau County.

The Bottineau Municipal Airport is the major aviation port in Bottineau County. Westhope has a Municipal airport which is the only other public airport in the county. Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to intentional causes. The size of accidents also varies widely from single engine incidents to large commercial crashes. The location of the accident, such as a remote area versus a populated location, also plays an important role in the amount of

destruction. Most aircraft accidents occur during takeoff or landing, and depending on the size of the aircraft, can be very serious events. Six private airstrips are also located in Bottineau County.

4.9.2 Geographic Location

Figure 4.9.2A shows the major transportation routes within Bottineau County, with County highways identified. Generally, those major highway routes are at greater risk for a transportation accident, however, a casualty accident cannot be ruled out anywhere in the county. Some risk exists countywide, including on township roads that are feeder roads to the county system and are also shown but not identified. Many township roads are minimum maintenance roads used mostly for farmer field access.

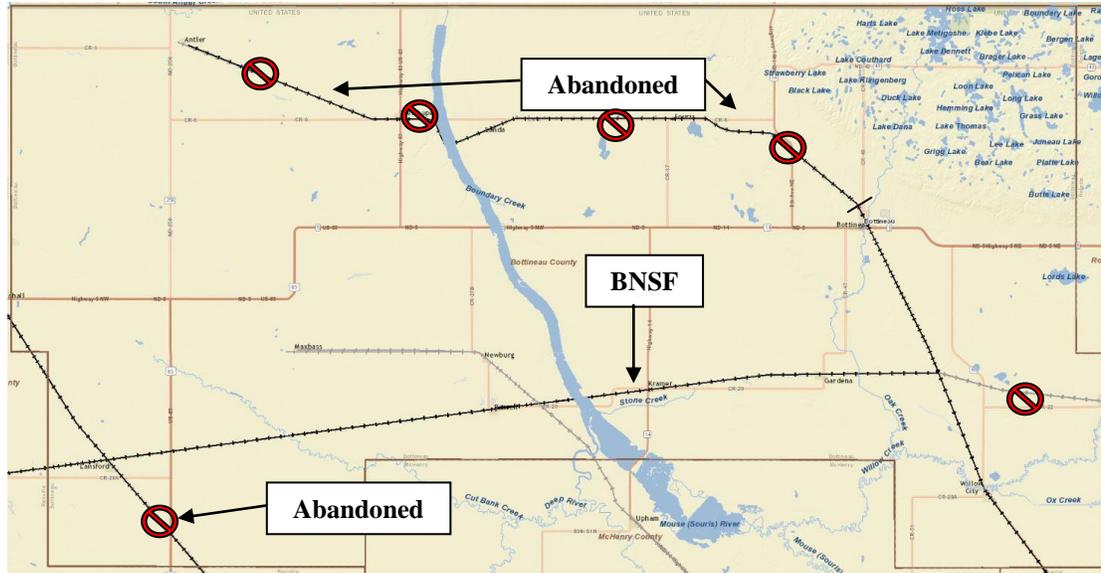


Bottineau County Railroads

The first railroad to come through Bottineau county was the Great Northern Railroad which ran from the Southeast corner of the county up through Willow City, Omemee, and ended in Bottineau. Soon after, the Soo Railroad laid track from the eastern side to the west and the two railroads became the dominant players in the county. In 2004, the BNSF line (which bought the Great Northern Railroad in 1970, which was merged with the Atchison, Topeka & Santa Fe Railway in 1996 to form the BNSF Railway) discontinued 16 miles of track from Souris to Westhope as the track had not been used in two years. Currently North Plains

Railroad services the Lansford area which merged with the Mohall Central Railroad in 2001 and operates track they bought from BNSF in western Bottineau and eastern Renville counties.

Figure 4.9.2B, Bottineau County Railroads



4.9.3 Previous Occurrences

The history of transportation accidents in Bottineau County consists primarily of small magnitude incidents, some with fatalities, but most with very little effect on the entire community. Traffic accidents along the roadways occur regularly, usually inconveniencing travelers, overwhelming local emergency resources, and occasionally causing delays. Table 4.9.3A shows the traffic fatalities in Bottineau County from 2009-2013. Table 4.9.3B shows the railroad accidents/incidents in the county since 2009.

Table 4.9.3A Motor Vehicle Accidents

Year	Number of Crashes	Total Injuries	Number of Fatalities
2009	NA	NA	0
2010	NA	NA	1
2011	NA	NA	5
2012	169	32	4
2013	116	20	1

Source: <http://www.dot.nd.gov/devisions/safety/docs/crah-summary.pdf>

Table 4.9.3B Railroad Accidents/Incidents

Year	Number of Accidents/Incidents	Number of Fatalities
2009	0	0
2010	0	0
2011	0	0

2012	0	0
2013	0	0
TOTAL	0	0

Source: Federal Railroad Administration, 2015. http://safetydata.fra.dot.gov/officeof_safety/publicsite/query/trainaccidentsfycywithrate.aspx

Table 4.9.3C has data on the fatal aircraft accidents in the county since 1964.

Table 4.9.3C Fatal Aircraft Accidents

Date	Location	Fatalities	Info
09/17/1995	Souris, ND	1	Homebuilt Ultralight. Pilot lost control. Passengers: Father (Dead), 1 Child (Serious Injuries), 1 Child (Minor Injuries)
07/14/1965	Souris, ND	1	Crop Spraying, Spin, failed to maintain flying speed

Source: National Transportation Safety Board, 2015. <http://www.nts.gov/layouts/nts.aviation/index.aspx>

Table 4.9.3D Bottineau County Transportation Accident Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

4.9.4 Probability and Magnitude

Table 4.9.4A is a graphical representation of the range of events that can occur within the transportation accident hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the transportation accident hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.9.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				Large Aircraft in Urban Area
	<i>No local history</i>			Interstate Bridge Collapse	
	<i>100 years</i>		Mass Casualty Accident		
	<i>50 years</i>	Fatal Car Accident			
	<i>Annually</i>	<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
	Impact				

Lacking a history of vehicular accidents resulting in mass casualties, the probability of such can only be theorized and expressed qualitatively. The probability is increased during winter storms, periods of poor visibility from snow, smoke, or dust, during holiday festivities with more instances of drinking and driving,

and during times of increased traffic volume. Vehicle accidents with minor damage and injuries occur regularly. Serious, fatal accidents are less frequent but still occur. On average, Bottineau County has 2 traffic fatalities annually.

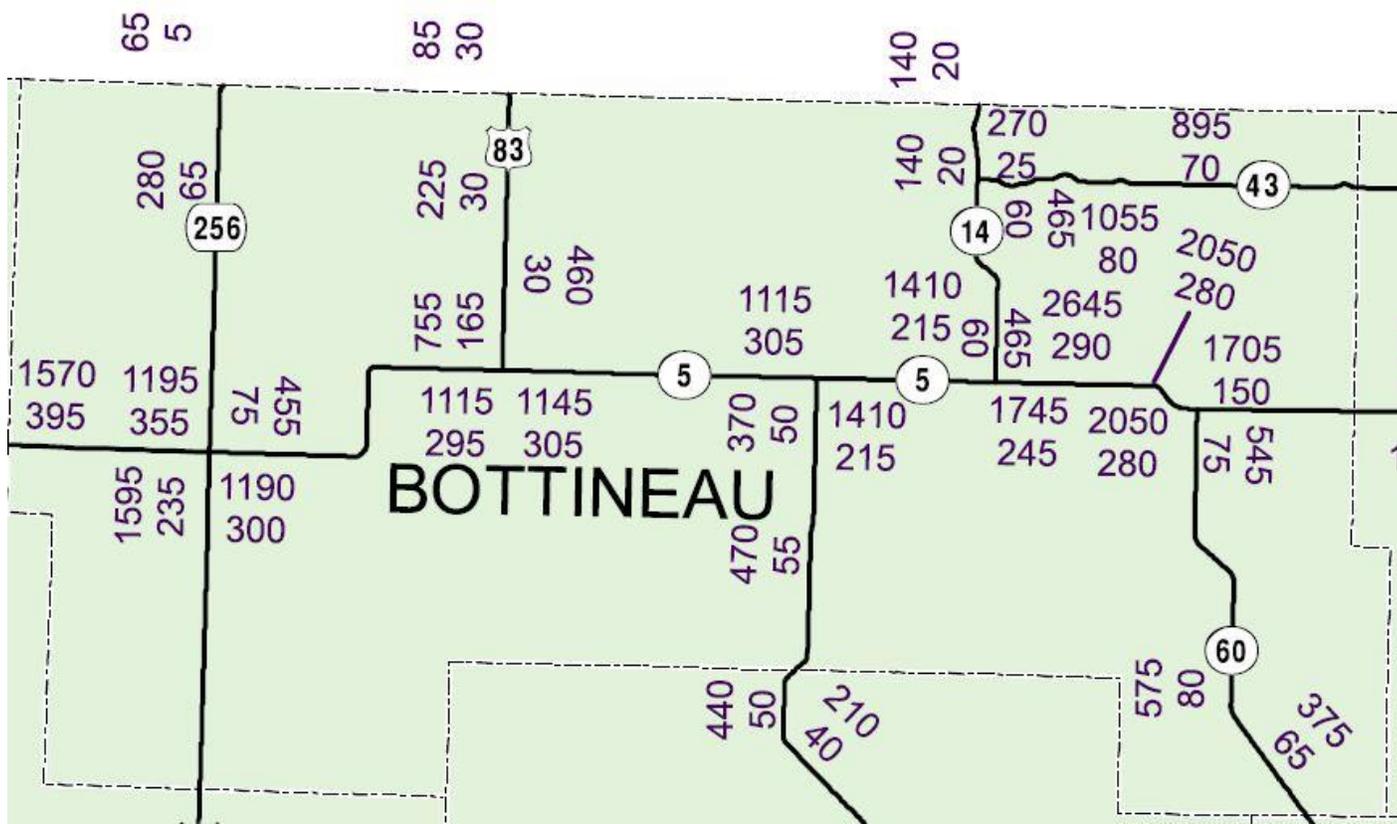
With increased rail traffic in North Dakota, there will be increased accidents in North Dakota. An incident involving a commercial passenger flight and mass casualties cannot be ruled out, the probability is considered lower. Any mass casualty incident that overwhelms the emergency response resources within the county and neighboring counties, such as a bus or plane crash, represents a high magnitude event. Bottineau County has had two plane crashes since 1964, one fatality occurred in each which both were caused by pilot error.

4.9.5 Risk Assessment

Vulnerability Overview

Transportation accidents can almost always be expected to occur in specific areas, on or near airports, roadways, railroads, or other transportation infrastructure. The exception is air transportation accidents that can occur anywhere and at any time, even though safety precautions are in place. However, it is difficult to predict the magnitude of any specific event because these types of events are accidental and the circumstances surround these events will impact the extent of damage or injuries that occur.

Bottineau County is determined to have a medium transportation infrastructure rating. The hazard rating was determined based on presence of railroad infrastructure which includes a transcontinental railroad (BNSF) and US Highway #83. The BNSF Railroad is a major transportation route for agricultural products produced on the Great Plains to move to eastern and western markets, oil is occasionally transported along this line, but is not the primary purpose of the tracks in Bottineau County.



LEGEND

- INTERSTATE NUMBERED HIGHWAY
- US NUMBERED HIGHWAY
- STATE NUMBERED HIGHWAY
- COUNTY LINE

TRAFFIC LEGEND

- AADT (Average Annual Daily Traffic) - 2500
- COMMERCIAL TRUCK TRAFFIC - 150
- THE TRAFFIC FIGURES ARE THE TOTAL AT THE CLOSEST HIGHWAY INTERSECTION OR TOWN.

2014

- YEAR COUNTED

(Source: ND Department of Transportation, 2015)

Daily Traffic Count

The Daily Traffic Count map demonstrates the cities along US Highway 5 and ND Hwy 83 have a higher traffic count than other areas of the county. Therefore they have a greater vulnerability for traffic accidents.

Data on cost estimates of previous vehicle events by county also provides some basis to draw conclusions on patters of traffic volumes. Table 4.9.5A is the NDDOT motor vehicle crash data and the associated costs for Bottineau County for 2011. According to NDDOT Crash Summary for 2013, 11.3% percent of the crashes in the state occurred in urban locations and 88.7% of the fatal crashes occurred on rural roads.

Table 4.9.5A Bottineau County NDDOT Motor Vehicle Crash Data and Associated Costs, 2013

Injuries	Fatalities	Crashes	Injury Costs	Fatal Costs	Costs
20	1	116	\$1,686,440	\$5,825,778	\$7,512,218

Source: North Dakota Department of Transportation, 2010

Loss Estimates

According to Medical and Economic Cost of North Dakota Motor Vehicle Crashes Report, by the Rural Transportation Safety and Security Center, Upper Great Plains Transportation Institute, North Dakota State University, a serious motor vehicle crash can have medical costs and substantial economic losses associated with death and injury. The costs of fatalities are based on the Value of a Statistical Life as reported by the U.S. Department of Transportation and does not include costs for medical expenses, property damages or other costs. The costs for non-incapacitating injury include wage and productivity losses, medical expenses, administrative expenses, motor vehicle damage, and employer’s uninsured costs from the Nation Safety Council. Using the 2012 conversions, the state spends an average of \$5,825,778 for each fatality that occurs on the roads and \$84,322 for each injury that occurs including both incapacitating and non-incapacitating.

4.9.6 Critical Facilities in Hazard Prone Areas

Except in the very rare case of an aircraft, train, or vehicle crashing into a critical facility, the facilities should remain unaffected by a transportation accident. Should structures be affected, damages could vary in the tens or hundreds of thousands of dollars depending on the structure or structures impacted. Should an accident occur in a developed area, structural losses in the neighborhood of \$296,000 (2 homes x \$148,000/average housing unit) could be expected. A large commercial jet crash could potentially destroy an entire segment of a populated area for a loss of roughly \$1,480,000 (assuming approximately 10 structures were destroyed). An accident involving a first response agency or blocking a primary transportation route could delay emergency services.

In most cases, infrastructure remains unaffected during transportation accidents. The most likely impact would be the closure of a major roadway due to a vehicular accident, thus resulting in travel inconveniences and long detours. Theoretically, an aircraft or vehicle can take out power lines, telephone lines, or other important pieces of infrastructure resulting in service disruptions.

4.9.7 Development in Identified Hazard Areas

Future development, particularly the associated increase in traffic, may increase the probability of a major transportation accident. Otherwise, the specific locations of where development occurs, except for possibly in the immediate vicinity of the airports or the railroad, should not significantly affect the vulnerabilities from this hazard.

4.9.8 Data Limitations and Other Key Documents

The data limitations related to the transportation accident hazard include:

- Difficulties in predicting the location and magnitude of future accidents

Other key documents related to the Transportation Accident hazard include:

- North Dakota Emergency Operations Plan, Transportation Annex
- North Dakota's Statewide Strategic Transportation Plan
- North Dakota Highway Safety Plan

4.10 Urban Fire or Structure Collapse

Frequency	Likely	10%-25% Probability in a given year
Impact	Moderate	Ad-Hoc Basis
Risk Class	2	Low-Moderate Risk
Seasonal Pattern	None-Winter highest probability of risk due to the higher demands of heating systems, increase use of portable heating units, etc.	
Duration	Averages 1 to 6 hours, length of time depends on how many buildings are involved; what type of fire it is; how it started; response factors	
Speed of Onset	Minimal warning	

4.10.1 Description

Fire is the result of three components: a heat source, a fuel source, and an oxygen source. When combined, these three sustaining factors will allow a fire to ignite and spread. Within a structure, a small flame can get completely out of control and turn into a major fire within seconds. Thick black smoke can fill a structure within minutes. The heat from a fire can be 100 degrees Fahrenheit at floor level and rise to 600 degrees at eye level. In five minutes, a room can get so hot that everything in it ignites at once; this is called flashover. (US Fire Administration, 2006)

The overall picture of fire safety information reveals that, per capita, the United States has one of the highest fire death rates in the industrialized world. Approximately 2,000-3,000 people die in residential fires in this country annually, and about 12,000-14,000 are injured. Children under the age of 5 and the population over the age of 54 are at the highest risk of death in fires. On average, fire kills more Americans annually than all natural disasters combined. In 2013, 97 firefighters died on duty. Statistics show approximately 1.5 million fires are reported annually; many others go unreported, causing additional injuries and property loss. About \$6-9 billion in direct property losses occur annually from residential building fires. In 2005, North Dakota had a fire death rate of 14.6 people per million compared to the national death rate of 11. (US Fire Administration, 2013). According to the National Fire Protection Association, US Fire Departments responded to an annual average of 366,600 residential home structure fires from 2007-2011. Half of all fires occurred between 11pm and 7am.

Although structure fires are usually individual emergencies and not community-wide disasters, the potential exists for widespread urban fires that displace several businesses or families and exceed local resources. Urban blocks, commercial structures, and apartment buildings are especially vulnerable. An urban fire that rages uncontrollably despite firefighting efforts and burns a large portion of a downtown area or an important structure could have significant economic impacts. Large fires of this nature have also been known to require significant community resources if lives are lost. Bottineau County has a smaller potential for large scale residential fires, commercial fires, natural gas explosions, and fires in public venues

due to smaller population and being a mostly rural county. Thus, there is the potential of agricultural chemical plant fires producing hazardous smoke and fumes.

The incorporated cities in Bottineau County each have a volunteer fire department; this includes Antler, Bottineau, Kramer, Maxbass, Newburg, Souris, and Willow City. The fire departments are equipped to handle basic structural and wildland fires (*See next section*) but are not trained and do not have the equipment to handle chemical, biological, radiological, nuclear, or explosive materials. The fire departments rely on the regional-paid departments of Devils Lake and Minot.

Smoke detectors, automatic fire alarm systems, automatic sprinkler systems, fire doors, and fire extinguishers can all prevent deaths, injuries, and damages from fire. Automatic sprinkler systems are especially important in preventing a small fire from becoming a conflagration.

Structure collapse occurs when the forces of gravity or other external forces overcome the structural integrity of a building. The reasons for structure collapse can vary from poor construction to extreme winds to gas explosions to heavy snow loads. Structure collapse can trap occupants and damage valuable property. Urban fires and structure collapse can happen independently from other types of incidents.

Table 4.10.1.A, Number of Firefighters by Department

Fire Department	Number of Fire Fighters	Department Type
Antler Fire Department	14	Volunteer
Bottineau Fire Department Station 1	28	Volunteer
Bottineau Fire Department Lake Metigoshe		Volunteer
Kramer Fire Department	10	Volunteer
Lansford Fire Department	15-20	Volunteer
Maxbass Fire Department	15-20	Volunteer
Newburg Fire Department	28	Volunteer
Souris Fire Department	16	Volunteer
Westhope Fire Department	15-20	Volunteer
Willow City Fire Department	20	Volunteer

Source: Bottineau County Fire Departments/Fire Protection Districts

The Minot Air Force Base also has firefighting equipment that may be able to be used in a large scale emergency.

4.10.2 Geographic Location

Urban fires can occur anywhere, but are generally most significant in downtown areas. Therefore, the cities are at the greater risk from urban fires. Structure collapses are possible on any given structure. Therefore, the risk of structure collapse is countywide.

4.10.3 Previous Occurrences

Structure fires occur regularly in Bottineau County, but most do not reach “disastrous” levels. Significant events in the county’s history include the Bottineau City fire of 1901 which destroyed 2 blocks of downtown businesses, other various ‘one and done’ fires like the fire which destroyed the Beaver Meat Market in Bottineau in 1913. Lansford ND has been plagued by fires throughout its history, including major ones in 1906, 1911, 1917, 1920, 1926, 1952, 1973, 1981, and 1984. Structure collapse occurs with much less frequency and is a very random event.

Table 4.10.3A Bottineau County Urban Fire or Structure Collapse Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

4.10.4 Probability and Magnitude

Table 4.10.4A is a graphical representation of the range of events that can occur within the urban fire and structure collapse hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the urban fire and structure collapse hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.10.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>			Large Occupied	
	<i>No local history</i>			Building Collapse	
	<i>100 years</i>		Downtown		
	<i>50 years</i>	Fatal Fire	Explosion & Fire		
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

The probability of a major urban fire or structure collapse is difficult to determine given only a limited history and recent improvements to building and fire codes. Older structures lacking automatic sprinkler

systems are more likely to experience a major urban fire and those structures with large span roofs or not up to building code standards are more likely to collapse.

A realistic yet devastating urban fire or structure collapse scenario is the complete and rapid destruction of an occupied building. In this scenario, little warning might exist for occupants and many could become trapped.

4.10.5 Risk Assessment

Vulnerability Overview

Property and the population are at risk from urban fires and structure collapses. Property losses are usually covered by insurance, but can be devastating to the building occupants, particularly for primary residences. These types of events often do not result in community-wide disasters, unless the structure is critically important to the economy. Fires and collapses that result in a significant loss of life or encompass the large part of a downtown or urban area would present the most significant challenges to local, tribal, and state government.

Depending on the time and location, a major structure fire could result in the loss of life either to firefighters or building occupants. The potential for this type of loss is difficult to determine due to advances in firefighter safety and the installation of sprinkler and alarm systems in many commercial and apartment structures. Those structures lacking smoke detectors are especially dangerous to the population. Should lives be lost, significant resources could be needed to manage the recovery.

Economic values could be lost if a business district were destroyed in an urban fire or structure collapse. For example, facilities of large employers or central community structures such as grain elevators could lead to significant community losses. Most historic buildings lack sprinkler systems and would lose much of their historical value in a fire or collapse.

Bottineau County has a low-moderate urban fire or structure collapse hazard rating. The rating was determined based on the 2010 housing density, which is an indicator of urban areas, which was 2.6 people per square mile. The rating was increased if there are no building code-enforcing jurisdictions in the county as building codes provide additional capability to prevent or minimize damages from structural fire or collapse. In Bottineau County, the county does not have mandatory building codes, but some local cities and townships do enforce some buildings codes. The age of structures in the county and fire department capabilities can also be important factors with respect to fire and collapse vulnerability. The county is fortunate to have good fire coverage in all rural areas. *(See Table 4.10.1A for each fire department)*

Loss Estimates

Urban fires caused 111 fire incidents in Bottineau from 2010 to 2014, resulting in \$3,114,350 in fire-related losses. This equates to an average loss of \$28,570.20 per fire incident or \$622,870 annually. During this same period there were no civilian injuries or deaths and no fire-service related injuries or deaths resulting

from fire-related incidents. There were no related civilian deaths due to fire since 2010. (North Dakota State Fire Marshall, 2015) With different types of fire incidents and death and injury occurrences, it is difficult to predict future fire loss estimates.

4.10.6 Critical Facilities in Hazard Prone Areas

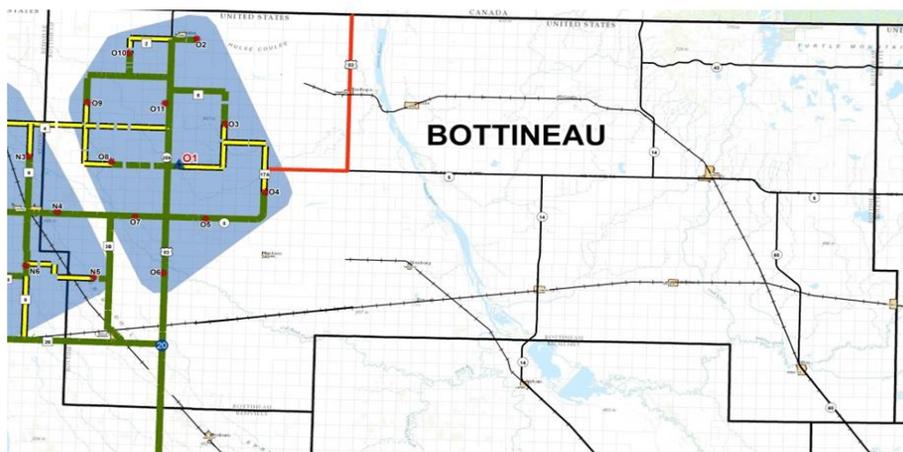
Any building is vulnerable to structure fire and collapse. However, sprinkler systems can minimize fire losses. Those critical buildings that do not have a sprinkler system are at greater risk for fire losses. Like structure fire, structure collapses will likely result in or near structural losses. Using a general assumption, given improvements on construction methodologies over the years, the older the building or property, the more likely it is to succumb to a structural collapse. Flat roofs are also more susceptible to heavy snow loading and collapse.

Depending on the type of infrastructure, a fire or structure collapse could result in short-term disruptions while services are rerouted. In the case of a supporting facility, such as the water treatment plant or a lift station, long-term disruptions could be seen. For example, a fire at an electric substation may leave residents without power for several hours or days or a fire at or collapse of a water treatment plant may leave communities without water for days or weeks.

Residential structure fires occur regularly, but typically do not result in community-wide disasters. Therefore, the greatest impacts are from fires and collapses that occur in downtown areas or at large businesses or civil buildings.

Structural Fires affecting DoD Property: There has been 1 incident of a structural fire at a DoD Missile Alert Facility (MAF), this incident occurred in Mountrail County, Nov 2000. Since then, Minot AFB has installed fire suppression systems in all MAFs. The expectation is that a local volunteer fire department will be the first on-scene responders to mitigate a fire in its incipient stage. Minot AFB will immediately dispatch firefighters to establish a unified command and engage in firefighting activities. Responding DoD personnel may take up to an hour to arrive on scene. Figure 4.10.6A shows the locations of the launch facilities and missile control facilities (O1) in Bottineau County. (Information courtesy of Minot AFB)

Figure 4.10.6A DoD-Controlled Assets in Bottineau County



4.10.7 Development in Identified Hazard Areas

Nationally, fire officials are working toward improved and stricter fire codes in all buildings. Fire codes usually cover the bare minimum of protection when buildings are constructed or remodeled. Future development in communities lacking fire and building codes will be more vulnerable than development that has the appropriate fire suppression systems and building codes for snow loads and structural stability in place. Two jurisdictions that have adopted buildings codes, including the 2009 International Building Code and 2009 International Residential Code in Bottineau County, are.....

4.10.8 Data Limitations and Other Key Documents

The data limitations related to the urban fire and structure collapse hazard include:

- Analyzing the hazard at the specific structure level. Such an analysis would be too detailed for a multi-hazard plan.
-

Other key documents related to the Urban Fire or Structure Collapse hazard include:

- North Dakota Emergency Operations Plan, Fire Annex

4.11 Wildland Fire

Frequency	Likely	10-100% probability in the next year
Impact	Minor	1%-10% of jurisdiction affected
Risk Class	2	Minor Hazard
Seasonal Pattern	April to November	
Duration	Averages 1 to 6 hours	
Speed of Onset	Minimal warning	

4.11.1 Description

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

Any flame source can trigger a wildland fire. Once ignited, ambient conditions dictate whether the fire will spread or not. Moist, cool, and calm conditions or a lack of fuels will suppress the fire, whereas, dry, warm, and windy conditions and dry fuels will contribute to fire spread. The terrain, accessibility, and capabilities of the fire agencies are also factors in the fire’s growth potential. Problems with wildfire occur when combined with the human environment. People and structures near wildfires can be threatened unless adequately protected through evacuation, mitigation, or suppression.

According to the North Dakota Forest Service, the state experiences over 700 wildfires that burn in excess of 35,000 acres annually on average. The primary factors influencing these wildland fires include type, amounts, and conditions of fuel supply (vegetation), temperature, wind, precipitation patterns, humidity levels, topography, and the levels of human activity on the land.

Bottineau County general wildfire season runs from April 1st through November 30th. There are three critical periods during wildfire season: early spring prior to green-up, late summer due to higher temperatures and a potential lack of rainfall, and fall following heavy frosts until snowfall. The first peak occurs during the spring before vegetation turns green. This tends to be a very critical time due to the fuel buildup from the previous growing season, drying winds, decreasing humidity, warmer temperatures, and increased human activity outdoors. The month of April accounts for about 20% of the wildfire starts and over a third of the total acreage burned. The second peak in the fire season coincides with the increase in harvesting activities during mid to late summer. Temperatures remain hot, humidity is at its lowest, and precipitation has declined significantly. The third and final peak in fire season occurs between September 1st and October 31st when wildland fuels are fully cured out due to hard frosts, winds are frequent and high, humidity is low, and human activity remains high. Forty percent of the annual fire starts occur in this third peak, accounting for 50% of the annual burned acreage. This third fire season typically extends until a season-ending snowfall.

The charred ground and thick smoke plumes that can be produced by wildland fires can create other, cascading hazards. The heavy smoke may lead to unhealthy air conditions affecting those with respiratory

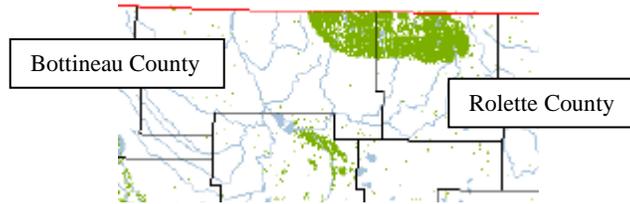
problems and otherwise healthy people. Smoky conditions can also lead to poor visibility and an increased probability of transportation accidents. With vegetation removed and the ground seared from a wildfire, the area also becomes more prone to flash floods and landslides because of the ground's reduced ability to hold water. This can be especially problematic when wildland fires occur in the spring at the same time that flood risk is high in Bottineau County.

Humans and human activity cause most of the wildland fires in Bottineau County based on historical data. Many human acts of carelessness are demonstrated by loss of fire containment while attempting controlled burns of fields, ditches, and sloughs. Other sources of fire are related to agricultural and industrial activities; recreational activities such as hunting, camping, and off-road vehicle travel, when conditions are right, occasionally along railroad right-of-ways, and through the annual use of fireworks around the 4th of July. There are also natural causes of wildland fires such as lightning.

Natural fuels, in contrast with irrigated, developed, or agricultural lands, can burn more readily, particularly on large tracts of natural fuels. Many of these tracts coincide with government lands. Bottineau County has a number of large US Fish and Wildlife Service and ND Game and Fish Department tracts. In addition Bottineau County has large acreage of ND State Forest Service land in the Turtle Mountains. Another group of large tracts of land containing natural fuels are the Conservation Reserve Program (CRP) acres. The US Department of Agriculture (USDA) Farm Service Agency's Conservation Reserve Program (CRP) is a voluntary program available to agricultural producers to safeguard environmentally sensitive lands. Producers enrolled in CRP establish long-term, resource-conserving covers to improve the quality of water, control soil erosion, and enhance wildlife habitat. In return, the Farm Service Agency provides participants with rental payments and cost-share assistance. Although the CRP benefits the environment in many respects, CRP lands may increase the fuels available and therefore the wildfire risk to nearby communities. As of 2014, Bottineau County had 58,333 acres participating in the CRP. (Farm Service Agency, 2014) Much of the CRP acreage is coming off of contract in the next few years and will be greatly reduced in future years reducing the wildfire risk. An additional roughly 6,875 acres of native grasslands and 47,033 acres of planted grass exist in the county. One to two tons of grass per acre is not uncommon, and when coupled with dry conditions and strong winds, both of which are common to the area, the potential for large wildland/rural fires exists. Some parts of Bottineau County have contiguous grasslands/forested land stretching for miles in length along the Souris River.

The Turtle Mountain area in Bottineau and Rolette County total 262,000 acres. About one-third or 87,246 acres of the Turtle Mountains is located in Bottineau County. Nominated as a Forest Legacy Area, the Turtle Mountains rise 800 feet above the surrounding northern Drift Prairie. The change in elevation results in an extra 10 inches of precipitation per year that support deciduous forest cover of bur oak, aspen, green ash, paper birch, boxelder, Juneberry and snowberry. Hundreds of large, deep ponds and lakes are present throughout this geologic feature. Many areas have been cleared for crops and pastureland despite the soil being rather erodible and poorly suited for farming. The result is grassland mixed with the native forest. The grassland is more at risk for a wildland fire than the forested area. The grassland increases the risk for a forest fire.

Figure 4.11.1A Forested Area of Bottineau and Rolette Counties (Turtle Mountains).



Wildland fires can have devastating effects, such as the loss of livestock and wildlife, the destruction of habitat, agricultural crops, forage, and watersheds, the loss of personal and real property, valuable timber, and shelter belts, and the degradation of scenic and recreational areas. Secondary damage can occur with soil erosion, silting of streams and reservoirs, contamination of wells, flooding, and damage to utilities.

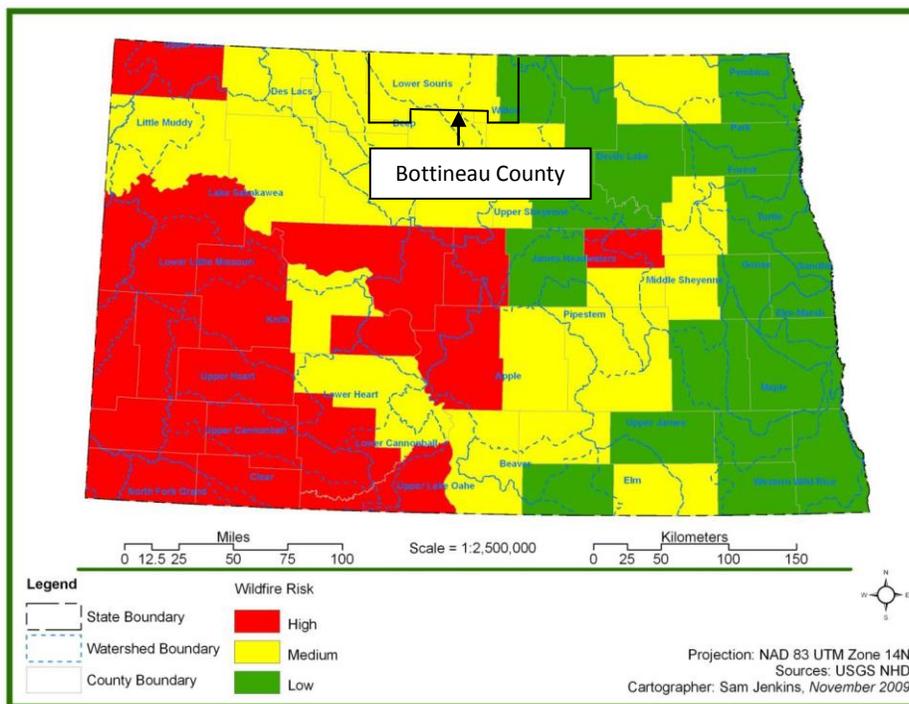
Limited resources in Bottineau County necessitate the cooperation of various agencies to help share the responsibility for wildland fire mitigation and response operations.

4.11.2 Geographic Location

Land cover demonstrates the type of fuels available for wildfires. In the case of agriculture, the flammability depends on the vegetation, its condition at that point in the growing season, and whether or not the land is irrigated. Native forest, grasslands and shrub lands are not usually managed significantly and may contain a build-up of flashy fuels year round. Figure 4.11.4B shows the land cover in Bottineau County. Structures located near government lands, forests, CRP lands, or other non-irrigated vegetation are generally considered at higher risk. Areas along the active railroad in the county are also at greater risk due to the elevated potential for railroad ignited fires. The entire county, however, is at some risk from wildfire.

North Dakota Forest Service in 2009 developed the wildfire risk by county based on wildfire occurrence, fire department response capabilities, and weather. Bottineau County was determined to have a Medium to Low risk.

Figure 4.11.2A, Wildfire Risk



In Bottineau County, this includes the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City

4.11.3 Previous Occurrences

Wildland fires occur annually in Bottineau County. Some have caused damages and others have not. The extent of damages often depends on the fire spread rate and the effectiveness of suppression and mitigation measures. The history of wildfires can be difficult to compile because of the various firefighting entities involved and a variety of recordkeeping measures over the years. The North Dakota Forest Service has a database listing wildfires from 2009-2012. During this period, 11 wildfires occurred burning 636 acres. Source: North Dakota Forest Service

Another source of information on historical occurrences and associated losses due to wildland fires is the SDA Risk Management Agency crop insurance claims as a result of fire. From the period from 2003 to 2012 (10 years), no crop insurance was paid as a result of wildland fire for Bottineau County. There have been no emergency or disaster declarations for wildland fire in Bottineau County.

4.11.4 Probability and Magnitude

Table 4.11.4A is a graphical representation of the range of events that can occur within the wildland fire hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when

assessing the range of magnitudes possible from the wildland fire hazard. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

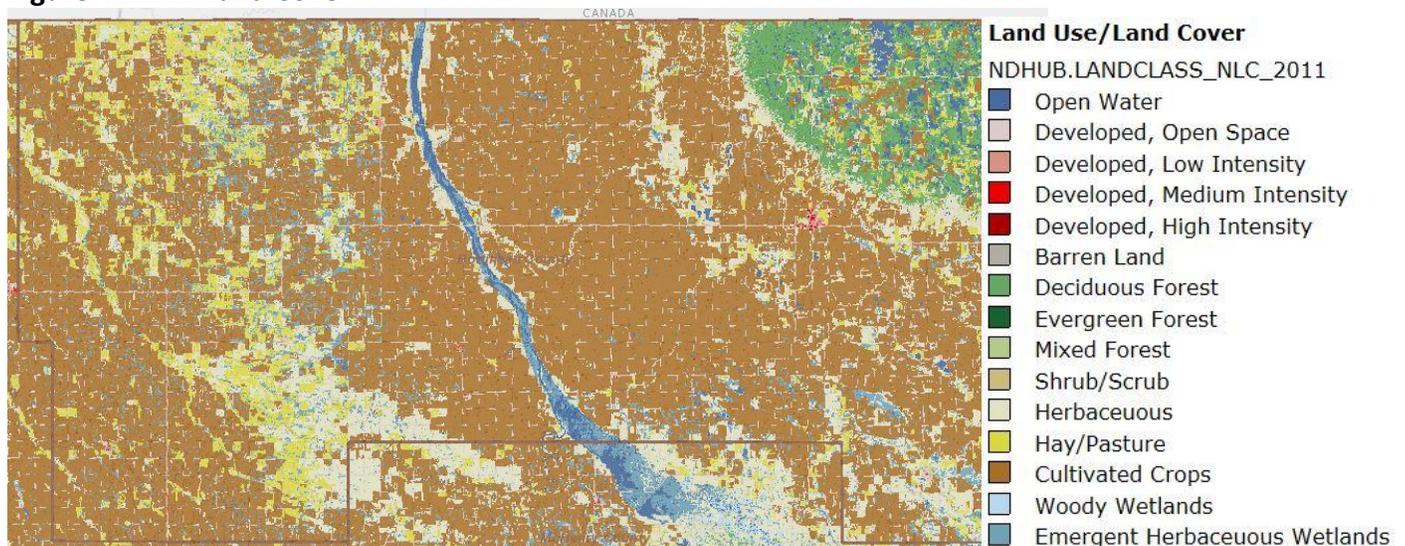
Table 4.11.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				
	<i>No local history</i>			Wildfire Burning	
	<i>100 years</i>		Wildfire Burning	an Entire City	
	<i>50 years</i>	Wildfire Burning	Many Residences		
	<i>Annually</i>	Farm Structures			
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
	Impact				

Wildland fires are usually an annual occurrence in Bottineau County. The frequency and size of the fires depend on the ambient conditions and other factors. The probability of a damaging wildland fire that burns uncontrollably despite firefighting efforts is difficult to assess. Generally, the summer and fall months, particularly during droughts, create conditions favorable to wildfires. If the weather conditions and fuels allow, especially if the winds are strong, wildland/rural fires can grow rapidly with little warning. The probability of wildfires is slightly elevated during active ignition periods such as the Fourth of July holiday and before fire restrictions are in place.

Wildland fires burning hundreds or thousands of acres are possible in the region given the right conditions. Such fires would require extra firefighting resources and mutual aid. Of greater significance, however, is a wildland fire that spreads into communities, destroying structures and infrastructure which is an unlikely occurrence in Bottineau County. However, Turtle Mountain residences are susceptible to wildland fire encroachment.

Figure 4.11.4B Land Cover



Source: ND GIS Hub, 2014

4.11.5 Risk Assessment

Vulnerability Overview

Homes, ranches, farms, and businesses can all be threatened by Bottineau County wildland fires, particularly those in rural areas surrounded by dry, natural fuels. Estimating damages can be rather difficult because future losses will be highly dependent on future fire characteristics and locations. History has shown that personal property losses can be much greater than just that of residences. Outbuildings, fences, equipment, livestock, pastures, hay bales, and crops are often additional losses. Generally, the land use is not expected to change much in the next ten years, so those areas that have historically been affected by wildland fires will probably continue to be at risk.

Generally, the population at risk can evacuate before a wildfire moves into their area. Occasionally when strong winds are in place, wildfires can move very rapidly and catch people by surprise, or people may just refuse to evacuate; fatalities and injuries are possible. In these types of situations, firefighters can also be at risk from rapidly moving wildfires. Many times, wildfire fatalities of the evacuating population occur when frantic drivers or poor visibilities due to smoke cause a traffic accident. According to the North Dakota Department of Transportation various lane/road closures have been necessary in the past due to reduced visibility resulting from smoke from grass fires. In recent incidents, wildfire deaths have been attributed to landowners trying to protect their own property without adequate firefighting protective equipment.

Wildfires can certainly have an effect on the regional economy. Rapidly moving wildfires can result in livestock, feed, and crop losses. Additionally, ranches may also feel the economic impacts of losing miles of fences and outbuildings. The closures and restrictions in recreation areas could lead to tourism industry losses. Natural resources are often lost during wildfires, but since wildfires are an important part of the ecosystem, such losses are usually only financial. Depending on the location, historic losses could also occur. Impacts to social values could occur for those under evacuation orders and others supporting the firefighting effort. Fire restrictions may prevent campfires, hunting, and other recreational activities people often enjoy.

The wildfire fire risk to jurisdiction is based on wildfire occurrence, fire department response capabilities, and weather as determined by the North Dakota Forest Service in 2009. The wildland fire risk to Bottineau County is considered Medium to Low. There are several reasons the wildland fire risk is medium to low. The reasons are the Bottineau County fire departments are considered adequate to fight any wildland fire that may occur because of the number of fire fighters, the equipment they have, and their mutual aid agreements. Table 4.11.5A lists the fire department types and number of fire fighters available.

Table 4.11.5A

Fire Department	Number of Fire Fighters	Department Type
Antler Fire Department	14	Volunteer
Bottineau Fire Department Station 1	28	Volunteer

Bottineau Fire Department Lake Metigoshe		Volunteer
Kramer Fire Department	10	Volunteer
Lansford Fire Department	15-20	Volunteer
Maxbass Fire Department	15-20	Volunteer
Newburg Fire Department	28	Volunteer
Souris Fire Department	16	Volunteer
Westhope Fire Department	15-20	Volunteer
Willow City Fire Department	20	Volunteer

Source: Bottineau County Fire Departments

To determine vulnerability based on the size of the fire department, Bottineau, Maxbass, Souris, and Willow City with between 28 and 17 firefighters have the least vulnerability while the other communities are about equal.

Loss Estimates

This vulnerability analysis involved the use of GIS to quantify the population and buildings at risk within wildfire risk zones. Wildland Fire data from the United States Forest Service SILVIS Lab is classified into 13 categories, based on 2010 Census housing unit density and percent of vegetation in the area. In both interface and intermix communities, housing units meet or exceed a minimum density of one structure per 40 acres. Intermix communities are areas where housing and vegetation intermingle and vegetation exceeds 50 percent. Interface communities are areas with housing in the vicinity of contiguous vegetation having less than 50 percent vegetation, and within 1.5 miles of an area that exceeds 1,325 acres and more than 75 percent vegetation. For the purposes of this plan, these areas were further classified into High, Moderate, and Low risk threat zones as follows:

High Risk Threat Zone (areas of various housing unit density within areas of high vegetation)

- 1. High Density Intermix
- 2. Medium Density Intermix
- 3. High Density Interface

Moderate Risk Threat Zone (areas of lower housing unit density within areas of high vegetation)

- 4. Medium Density Interface
- 5. Low Density Intermix

Low Risk Threat Zone (either no vegetation, or no housing density)

- 6. Low Density Interface
- 7. High Density No Vegetation
- 8. Medium Density No Vegetation
- 9. Wild land Intermix
- 10. Uninhabited Vegetation

- 11. Uninhabited No Vegetation
- 12. Low Density No Vegetation
- 13. Wild land No Vegetation

The SILVIS Census Blocks were selected within GIS. The total population and number of housing units within each zone was summarized based on 2010 Census Block data included in the SILVIS data set.

Table 4.11.5B Population and Housing Units in SILVIS High and Moderate Risk Threat Zones

Pop – in High Risk	Housing Units in – High Risk	Pop – in Moderate Risk	Housing Units- in Moderate	Total Population in High and Moderate Risk	Total Housing Units in High and Moderate Risk
142	265	531	811	673	1076

Source: SILVIS Lab Wild land Urban Interface Data

To estimate losses an exposure analysis was used based on applying the average value of housing units in each county multiplied by the combined number of housing units in the High and Moderate risk categories. For the purposes of estimating potential loss, the total average value is used, as catastrophic fires tend to result in total loss of the structure. It is very unlikely that a wildfire would result in loss of all the structures potentially at risk within a given county, but the results provide an indication of where the highest losses from a fire in the Interface or Intermix areas could occur. There are 265 total housing units in High and Moderate Risk Categories in Bottineau County, with a median housing value of \$101,238, which equates to a total of \$26,828,070 housing values in High and Moderate Risk Areas. These housing units are scattered throughout the county. They are located in or near the wooded areas of the county which are near lakes, rivers and streams.

4.11.6 Critical Facilities in Hazard Prone Areas

Wildland fire can affect any vegetated part of Bottineau County but is most prevalent in the abundant fuels of the rural areas.

Wildland fires have the greatest potential to threaten structures lacking defensible space. Defensible space is a buffer zone between a structure and flammable fuels. Irrigation, mowed areas, fuels thinning, roads, and waterways can serve as buffers to wildfires in some cases. The threat to a structure can truly only be assessed on a case-by-case basis. In many cases, critical facilities are located in developed communities, and therefore, are provided some measure of protection from the surrounding development and irrigated agricultural lands.

Often regional electric infrastructure passes through wildland and non-irrigated agricultural areas. In particular, electric substations and transmission lines and telephone lines can be buffered by or overhang natural fuels. A wildfire could disrupt electricity or communications should this infrastructure be damaged.

Propane tanks also become hazardous infrastructure when a wildfire encroaches on a structure. Temporary disruptions or low flows on the public water system may occur if large amounts of water are used to fight a fire, particularly during periods of drought or peak usage times.

Other critical facilities that support government services and private utilities may also be located in areas vulnerable to wildland fire. Damages to such facilities may seriously disrupt emergency and essential services.

4.11.7 Development in Identified Hazard Areas

Remote, isolated, forested areas are becoming more popular places to live or to have a second home, as national trends show. Growth in these parts of Bottineau County, especially in the Turtle Mountains at the lakes such as Lake Metigoshe is possible. Regulating growth in these areas is a delicate balance between protecting private property rights, promoting economic development, and promoting public safety. Future development could have a negative impact on the wildland fire vulnerabilities, putting more people and property in harm's way. Few Bottineau County communities have requirements related to ingress and egress, building sites, densities, water supply, building materials, and fuels maintenance.

The projected population change in Bottineau County from 2010-2025 is to remain basically the same and therefore determined to have Low to Medium Risk to Wildland Fire by the State's 2009 Assessment.

4.11.8 Data Limitations and Other Factors

The data limitations related to the wildland/rural fire hazard include:

- Lack of a comprehensive, multi-agency, historic wildfire digital database containing information on start location, cause, area burned, suppression costs, and damages
- Lack of mapping of Conservation Reserve Program lands

Other key documents related to the Wildland Fire hazard include:

- North Dakota Emergency Operations Plan, Fire Annex
- North Dakota Forest Service, Building Sustainable Communities Through Forestry
- North Dakota Statewide Assessment of Forest Resources and Forest Resource Strategy
- Fire Management Plans for federal lands
- Bottineau County Community Wildfire Protection Plan

4.12 Severe Winter Weather

Including Blizzards, Heavy Snow, Ice Storms, Extreme Cold, and Wind Chill

Probability	Very Likely	Nearly a 100% probability in the next year
Impact	Minor	1%-10% of jurisdiction affected
Risk Class	3	Moderate Hazard
Seasonal Pattern	Winter: November-April	
Duration	Averages 48 to 72 hours, Maximum 5 days, Minimum 12-14 hours	
Speed of Onset	12-24 hours, Advance Warning is possible with ample warning from National Weather Service but actual speed of onset will vary	

4.12.1 Description

Winter storms take many forms and vary significantly in size, strength, intensity, duration, and impact. The composition of a storm varies with the temperature, wind, and amounts of precipitation. Important factors in winter storms include temperature, wind, wind chill, rain, sleet, snow, and blowing snow. Exceptional winter storms can and do cause problems for the communities, residents, and travelers. Examples of these types of storms include blizzards, ice storms, heavy snow events, and extended extreme cold temperatures. While these types of events may not sound serious, the combinations of cold temperatures, wind, snow, wind chills, ice, and reduced visibilities can make these storms very deadly and costly.

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

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

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

Winters in North Dakota can be harsh, and Bottineau County is no exception. Winds, snow, and cold temperatures blast the region every winter. On average, the coldest month is January with average high temperature of 23.32°F and average low temperatures of -14.31°F. January temperatures are colder in northeastern North Dakota than anywhere else in the state. Bottineau County is in North Central North Dakota; average winter temperatures are not much warmer than Northeastern North Dakota. An average January temperature in Bottineau County is about 2.47°F versus an average January temperature of 14°F in the southwestern corner of the state in Bowman County. In Bottineau County, snow has fallen in all months except June, July, and August. Freezing temperatures/frost in late May is likely. Given these facts, most people in the region expect winter conditions, and lifestyles are not disrupted by snow and cold. In fact with the Turtle Mountains, numerous lakes, and snow mobile trails in Bottineau County winter weather is welcome for downhill skiing, cross country skiing, ice fishing, and snowmobiling. Exceptional winter storms, though, can and do cause problems for the communities, residents, and travelers.

Blizzards

Blizzards, as defined by the National Weather Service, are a combination of sustained winds or frequent gusts of 35 mph or greater and visibilities of less than a quarter mile from falling or blowing snow for 3 hours or more. A blizzard, by definition, does not indicate heavy amounts of snow, although they can happen together. The falling or blowing snow usually creates large drifts from the strong winds. The reduced visibilities make travel, even on foot, particularly treacherous. The strong winds may also support dangerous wind chills. North Dakota leads the nation in blizzard frequency with 3-4 blizzards on average annually.

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

The impact of a severe blizzard with low visibility, heavy snow, and cold temperatures can bring the entire region to a standstill. Utility and communication systems are often interrupted. Road systems are rendered impassable which causes school, workplace, and commercial shutdowns. This in turn magnifies the emergency and medical management needs of the community. Rural residents are especially hard hit if they are not adequately stocked with food and fuel. The livestock industry can be severely impacted. The inability to get feed and water to livestock can become critical quickly. Dehydration is a major cause of livestock casualties. Cattle can't lick enough snow to satisfy their thirst; they die of lack of water before succumbing to cold or suffocation.

Heavy Snow

Other hazardous winter storms also exist that do not meet the criteria of a blizzard. Winter storms containing heavy amounts of snow, rapid snowfall rates, or enough wind to reduce visibilities and create hazardous road and outdoor conditions are an annual occurrence in the state. Six inches or more in 12

hours or eight inches or more in 24 hours constitutes conditions that may significantly hamper travel or create hazardous conditions. The National Weather Service issues warnings for such events. Smaller amounts can also make travel hazardous, but in most cases, only results in minor inconveniences. Heavy wet snow before the leaves fall from the trees in autumn or after the trees have leafed out in the spring may cause problems with broken tree branches and power outages.

Ice Storms

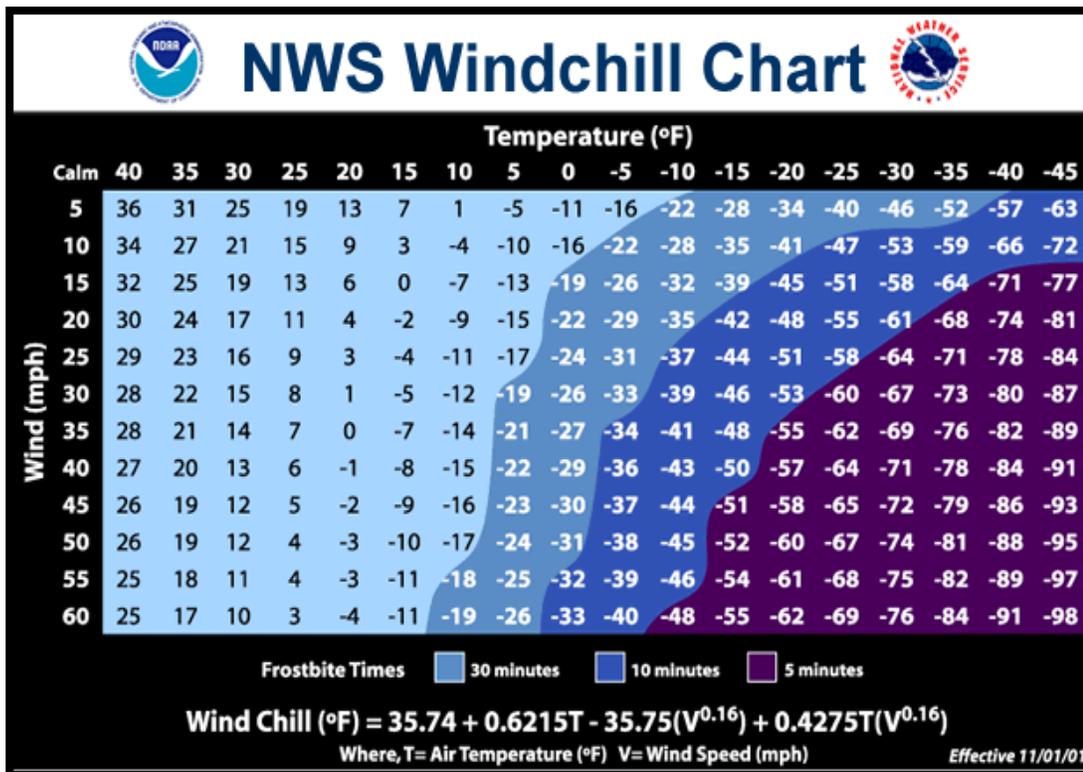
Ice storms develop when a layer of warm (above freezing), moist air aloft coincides with a shallow cold (below freezing) pool of air at the surface. As snow falls into the warm layer of air, it melts to rain, and then freezes on contact when hitting the frozen ground or cold objects at the surface, creating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

Extreme Cold

Extended periods of cold temperatures frequently occur throughout the winter months in Bottineau County. Heating systems compensate for the cold outside. Most people limit their time outside during extreme cold conditions, but common complaints usually include pipes freezing and cars refusing to start. The coldest temperature recorded in Bottineau County is -50°F recorded February 3, 1893. When cold temperatures and wind combine, dangerous wind chills can develop.

Wind chill is how cold it “feels” and is based on the rate of heat loss on exposed skin from wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature, and eventually, internal body temperature. Therefore, the wind makes it feel much colder than the actual temperature. For example, if the temperature is 0°F and the wind is blowing at 15 mph, the wind chill is -19°F. At this wind chill, exposed skin can freeze in 30 minutes. Wind chill does not affect inanimate objects. (National Weather Service, 2007) Figure 4.12.1A on the following pages shows the wind chill chart.

Figure 4.12.1A National Weather Service Wind Chill Chart



Source: National Weather Service, 2009.

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

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

Strong winds and ice or snow accumulations can take down utility lines. A long-term utility outage becomes more significant during extended cold periods as sheltering and cold weather exposure becomes more challenging. Accessing those in rural areas following heavy snow events to deliver supplies or provide

emergency services can be difficult; the need for such services would be compounded by any long-term utility outage. In Bottineau County, like many other North Dakota counties, severe winter seasons often translate to severe flooding potential in the spring.

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

4.12.2 Geographic Location

The winter storm hazards, such as blizzards, ice storms, heavy snow, and extreme cold, usually occur on a regional or even statewide scale. As the historical record indicates, winter storms are a formidable hazard for all parts of the state. In Bottineau County, this would include the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City

4.12.3 Previous Occurrences

Bottineau County experiences extreme winter weather events annually. A summary of some of the more significant events are shown in Table 4.12.3A.

Table 4.12.3A Significant Winter Weather Events – Blizzard, Ice Storm, Heavy Snow, Extreme Cold, Wind Chill

Date	Type	Impacts
01/17/1996	Blizzard	A strong low pressure center located over the central plains combined with strong arctic high pressure moving south out of Canada to bring blizzard conditions to North Dakota. Snowfall amounts range from 8 inches at Williston in the northwest to 20 inches at Wahpeton in the southeast. Winds gusting to 55 mph created 3 to 5 foot drifts in central North Dakota. Many schools and businesses closed on the 17th and did not re-open until a few days later. With temperatures dropping to 10 to 20 degrees below zero, wind chills varied from 60 to 80 below zero, snow removal was hampered with hydraulic and cooling systems freezing on snow plows. Mail service was disrupted statewide for the 17th and 18th. The cold also caused several water main breaks and minor power outages.
02/01/1996	Severe Cold/Wind Chill	Dangerously cold weather once again hit North Dakota. The town of Rolette (Rolette Co.) in north central North Dakota reported a morning low of 53 below. Many places reported lows from 35 to 45 below. Fargo tied its record low of 39 below. The temperature at Fargo remained at or below zero for 11 straight days (1/23/96-2/3/96). This ties the second longest subzero period, previously set in 1899. Daytime highs fared no better, as Bismarck reached a high of 26 below. Northwest winds up to 30 mph created wind chills to 100 below. Electric companies reported peak loads, while natural gas companies had trouble keeping gas flowing through pipelines. Numerous schools closed and many water main breaks occurred. There were also shortages of #1 diesel fuel.
02/10/1996	Blizzard	Northwest winds of 30-40 mph combined with fresh snowfall to create blizzard conditions across northcentral and eastern North Dakota. From 0200-0700 CST the Minot Air Force Base reported visibilities less than an eighth of a mile. Winds also gusted to 70 mph at the base. U.S. Highway 2 was also closed from Devils Lake to Grand Forks. Many schools were forced to close.

11/23/1996	Severe Cold/Wind Chill	Bitter cold arctic air followed the previous storm system, bringing record or near record temperatures to much of northern North Dakota. On the 23rd, Williston tied their record low of 21 below set in 1900, on the 24th, they reached 27 below which shattered the old low of 18 below set in 1977, on the 25th they fell to 26 below which tied the record set in 1898, and on the 26th they bottomed out at 22 below which also was a new record. On the 25th, Minot set a new record low of 13 below which broke the old record of 12 below set in 1921.
12/16/1996	Blizzard	A strong low pressure center moved southeast out of Canada into the northern plains bringing with it blizzard conditions. The blizzard lasted for 3 days in North Dakota. The blizzard began in the western part of the state the morning of Monday, December 16 and didn't exit the eastern part of the state until the evening of Wednesday, December 18th. This was the first 3 day blizzard since the winter of 1980-81. The light snow combined with north winds gusting to 50 mph to produce massive blowing and drifting of snow. Temperatures also plummeted down to 20 below creating wind chills from 40 to 60 below. Visibilities were so poor that the ND Highway dept. pulled the plows off roads the evening of the 16th and didn't allow them to return to the roads until the afternoon of the 18th. Snow drifts as high as 10 feet were common. Many school districts cancelled school Monday through Wednesday. With the closed roads, mail was delayed up to 3 days in many communities. The strong winds made the drifted snow so hard that many plows just rode up and over the drift instead of knocking it down. There are also reports of snow plow blades being broken off by the hard compacted snow. Many ranchers faced the possibility of losing part of their cattle herd due to the cold and being unable to get food to them.
12/25/1996	Severe Cold/Wind Chill	The blizzard of the 16th-18th left in its wake very cold air. Williston set a new state record low of 32 below the morning of the 25th, and Bismarck set a new record low high temperature for the date, with the mercury struggling to 10 below for a high. Lows across the state that morning varied from 20 to 30 below with highs from 10 to 20 below.
01/04/1997	Blizzard	The economic impact these 4 blizzards in December of 1996 and this blizzard had on North Dakota were staggering. On the agricultural side alone, it is estimated that over 6 million was lost for buildings and machinery, 4.7 million in livestock deaths, 21.7 million for extra feed consumption, and \$50,000 worth of dumped milk when transporters couldn't get to the farms. In addition, it's estimated that \$600,000 was spent by the Game and Fish Dept. to help farmers battle the deer that was eating their hay reserves. Also, it's estimated that the National Guard spent \$800,000 in January to help with snow removal. Many communities spent up to 10 times their snow removal budget just in January alone, with the state itself spending an estimated additional \$125,000 in salaries and operating expenses. The January of 1997 will be long remembered in the minds of many North Dakotans.

01/09/1997	Blizzard	<p>The second blizzard in less than 1 week brought North Dakota to a virtual standstill. This blizzard didn't bring as much snow as the first storm, but the winds gusted from the northwest as high as 40 mph and they lasted for 3 days. The strong winds combined with this snow as well as the snow from the blizzard a few days earlier created widespread whiteout conditions that lasted for 3 days. There were numerous communities that halted mail delivery and cancelled school. Again, almost every major road in North Dakota was closed and plows pulled off. Many buildings were beginning to fail from the weight of the snow of this storm and the previous one. There were reports of people getting stranded in vehicles for up to 40 hours. Those that stayed with the vehicle survived, but those that didn't either perished or suffered 2nd and 3rd degree burns over 70-90 percent of their body. As the storm was winding down on the 11th and 12th, bitter cold air moved in, and with the strong northwest winds still blowing, wind chills plummeted to 85-90 below with actual air temperatures 20-30 below. With the amount of suffering and hardship going on, Gov. Schafer of North Dakota declared the state a disaster area. This was followed on the 12th with President Clinton approving the 1st ever request to declare a major statewide disaster. The national guard was called in to help with snow removal as many communities had already spent their snow removal money before this storm. Injuries and dollar damage amounts estimated.</p>
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<p>04/04/1997</p>	<p>Blizzard</p>	<p>Warm weather the first three days of April lead much of North Dakota to believe that spring had arrived with temperatures in the 60s and 70s. Mother Nature had other plans. A very strong area of low pressure moved out of the Colorado area into the northern plains. Warm moist air ahead of the low collided with cold air coming down from Canada. The result was the worst blizzard of the season for North Dakota, bringing much of the state to a complete halt. The precipitation began to fall during the afternoon of the 4th (Friday), as rain in the east and freezing rain or sleet in the west. By Friday evening the freezing rain and sleet had changed over to all snow in the west. By Saturday afternoon the heavy snow moved into the central part of the state, reaching the eastern part of North Dakota later that night. Snow accumulations were on average 1.5 to 2 inches an hour with 50 to 60 mph winds as well. The blizzard ended in the west on the morning of the 6th (Sunday), but continued into the evening across the east. The additional snow at Bismarck brought the season snowfall total to 101.4 inches, which set an all-time record. The old record was 91.8 inches. In Jamestown, they received 1.62 inches of rain before changing over to snow. After the devastating January blizzards, this was the storm that may have broken the back of many of the state's ranchers. An estimated 100,000 head of cattle (10% of the state's herd) was lost, with a large percentage of that being calves and yearlings. The estimated dollar loss is well over 5 million dollars. An estimated 21.5 million dollar's worth of damage was done to farm buildings that collapsed under the weight of the heavy snow. Because of the closed roads, an estimated 200,000 pounds of milk had to be dumped when the trucks couldn't make it to pick up the milk. The dairy company that was supposed to pick up the milk also suffered damages. The roof collapsed under the heavy load, killing 40 dairy cows and injuring 45 others. Many power poles fell from the weight of the ice and snow combined with the strong winds. It's estimated that over 300 wooden poles had to be replaced, with one power company reporting about 100 steel towers damaged or destroyed with over 200 miles of transmission line down. An estimated 75,000 homes were without power for some time over the weekend, with a few houses having to wait 4-5 days before power was fully restored. The state's electrical grid was in such patch work condition that the governor requested that people conserve as much energy as possible for rear of overtaxing the system and creating a widespread brownout. National Guard helicopters were used to help power companies assess the damage done to power poles and lines. With the widespread power outages, many people had to resort to burning wood or running gas powered generators to keep their homes warm. This lead to a few reports of carbon monoxide poisoning. Numerous vehicles were stranded in and out of towns, as well as people. I-94, I-29, and all other major highways in the state were closed for the weekend. On the 7th(Monday), President Clinton declared North Dakota a disaster area for the 2nd time this winter, freeing up grants and making low interest loans possible. The effects of the April '97 blizzard will be felt for some time to come. The fear now is that as the snow melts revealing the cattle that perished during the storm, ground water contamination is now possible as cattle decay in the spring sun. Ranchers also fear that the storm may have weakened the surviving cattle and calves to the point that disease may now take over and kill off part of the herd. Property damage dollar amount estimated.</p>
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02/25/1998	Blizzard	<p>The first major winter storm to hit North Dakota in the 97/98 winter season waited until the last few days of February. A Colorado low pressure system brought a three day blizzard to western and north central North Dakota. Five injuries were reported and all were due to vehicular accidents in blowing snow and poor visibilities. Icy power lines combined with wind gusts over 45 mph dropped power poles in many counties. Numerous power outages were reported from Dickinson to Williston to Minot to Bottineau, especially in rural areas. One estimate had 3,500 rural electric customers without power at one time. Some areas near Newtown, Sherwood, Mohall and Lansford were without power for 70 hours. The strong winds caused 20 foot snow drifts in Beach which stranded 200 truck drivers and numerous other travelers. Interstates and highways were blocked due to snow and low visibilities. An estimated 100 people had to be rescued by emergency response officials during the storm. Blizzard warnings were in effect for 60 hours. Most schools and businesses were closed during this storm. The highest snowfall report was 29 inches in Westhope, other reports included 23 inches in Minot, 18 inches in Williston, and 15 inches in Dickinson. Lightning was reported with the snow in Minot on Wednesday, February 25.</p>
06/03/1998	Severe Cold/Wind Chill	<p>Beekeepers lost honey production when an early June cold snap destroyed 75% of the alfalfa crop. Low temperatures reached the mid-20s while normal lows are in the mid-40s.</p>
04/01/1999	Blizzard	<p>Major winter storm centered over Nebraska early morning on the 1st of April. Inverted trough extended into eastern Montana. System moved slowly east during the day. Instability brought heavy snow and thunder to parts of North Dakota. Ahead of this storm system thunderstorms with 1/2 inch hail fell over parts of east central North Dakota before turning to freezing rain and snow later in the day. Gusty northwest winds caused low visibilities in blowing and drifting snow over a wide area of western and central North Dakota. Six to fifteen inches of snow fell over the warned area. Heaviest snowfall of fifteen inches occurred over McHenry county in north central North Dakota. Over east central and parts of southeast North Dakota ice accumulated around 2 inches downing power lines and numerous trees. Power outages reported in a wide area. Heavy wet snow followed the ice with accumulations of five to 8 inches reported.</p>
12/19/1999	Blizzard	<p>A strong low pressure system moved rapidly out of Alberta Canada and raced along the southern Canadian border. Behind the system a strong arctic cold front was ejected south into the northern plains and produced gradient winds out of the northwest at 40 to 60 mph. Snowfall with the system ranged from 1 to 3 inches. The strong winds produced visibilities less than a quarter-mile in most areas to near zero in open country. Temperatures fell to the single digits by midafternoon. The cold air combined with the wind generated wind chills of 40 to 60 below zero.</p>

12/16/2000	Blizzard	<p>A strong low pressure system moved rapidly across southern Canada ushering frigid arctic air and strong northwest winds across western and central North Dakota. Wind gust to 60 mph were common throughout the region. The frigid arctic air kept daytime temperatures 5 to 10 below zero. The cold temperatures coupled with the high winds brought dangerous wind chills to 75 below zero. Snowfall was light, around an inch total, however existing snow on the ground created near zero visibilities in blowing and drifting snow for an extended period of time. This prompted the closing of many roads throughout western and central North Dakota.</p>
01/04/2004	Severe Cold/Wind Chill	<p>A strong arctic high pressure system over British Columbia Canada moved southeast into the northern plains Sunday, the 4th of January and brought extremely cold temperatures and gusty winds to western and central North Dakota. Temperatures reached 20 to 30 below zero Sunday night and remained between 10 and 20 below zero on Monday. West winds of 10 to 25 mph combined with the subzero temperatures created wind chills ranging from 45 to 58 below zero over western and central North Dakota. The winds also created low visibilities in blowing snow in many areas of the region. Some roads were closed due to the blowing and drifting snow over parts of northern North Dakota. The frigid temperatures lead to power outages and water line breaks in several areas.</p>
01/27/2004	Severe Cold/Wind Chill	<p>An approaching arctic high pressure system over southern Canada and exiting low pressure system over the northern plains brought extremely cold temperatures and bitter wind chills to western and central North Dakota. Ambient temperatures ranging 20 to 35 below zero combined with northwest winds to 30 mph resulted in widespread wind chill factors of 40 to 65 below zero. In southwest North Dakota, in Adams County, icy roads and reduced visibilities in blowing snow resulted in a fatality (indirect) when a 35 year old male lost control of his vehicle and rolled several times. The driver was ejected from the vehicle. The arctic high pressure system settled over the region late Wednesday morning on the 28th of January and brought diminishing winds to the area.</p>
02/10/2004	Blizzard	<p>The winter storm warning for western and central North Dakota was upgraded to a blizzard warning in the afternoon of the 10th. Strong winds of 50 mph combined with snow had reduced visibilities to zero at times by the late afternoon hours and remained at or near zero through the night. A gradual improvement began in the morning of the 11th. Snow drifts to 20 feet were reported in the northwestern areas of the state. Local and county snow removal equipment was not sufficient to move the snow and local and county governments requested state assistance. Many roads and parts of Interstate 94 were closed stranding numerous motorist and bringing travel to a standstill. The railroad system in northern portions of the state was also halted due to the large snow drifts. An Amtrak train became stuck near Epping North Dakota and had to backup to Williston North Dakota, about 15 miles to the southwest. Numerous vehicles went into ditches, stalled out or became stuck in the heavy snowdrifts. Only minor injuries (indirect) were reported. Snowfall from the storm only amounted to around an inch; however snowpack from previous snow events combined with the strong winds created blizzard conditions throughout western and central North Dakota. Conditions rapidly improved by the late morning on the 11th as the storm system exited the region</p>

01/12/2005	Blizzard	A low pressure system over Alberta Canada moved rapidly southeast through North Dakota. The storm system brought areas of snow and wind producing blizzard or near blizzard conditions over parts of northern North Dakota. Winds up to 45 mph caused blowing and drifting snow and whiteout conditions. Visibilities dropped less than 200 feet prompting the North Dakota Highway Patrol to close several highways and secondary roads.
01/13/2005	Severe Cold/Wind Chill	An arctic high pressure system dropped southeast out of central Canada on the evening of the 13th of January. The system brought bitter cold temperatures to western and central North Dakota the night of the 13th. The air temperatures overnight dropped between 20 to 35 degrees below zero with daytime temperatures ranging 10 to 20 below zero. The subzero temperatures lasted through the morning of the 15th. Northwest winds up to 20 mph accompanied the cold air producing extreme wind chills of 40 to 60 below zero across the region. Many schools and outdoor activities were cancelled due to the bitter cold.
10/05/2005	Blizzard	October 5, 2005, brought an early and very significant blizzard to the Northern Plains including western and northern North Dakota. A large band of 15 plus inches of snow fell from the southwest into the north central including from Bowman, through Amidon, New England, Medora, Dickinson, Halliday, Grassy Butte, Garrison, Max, Tioga, time at Dickinson and Minot and to less than a quarter mile at Hettinger and Williston in snow and blowing snow. Winds gusted to 48 mph at Minot, 45 mph at Hettinger, 40 mph at Williston, and 35 mph at Dickinson. Heavy wet snow pulled down trees and power lines, halted transportation, and disrupted the lives of thousands. In many areas you needed a yardstick to measure the snow. Power outages were reported in Bottineau, Bowman, Burke, Dunn, Golden Valley, McHenry, McKenzie, McLean, Mercer, Oliver, Rolette, Sheridan, and Ward counties. Transportation came to a standstill as the storm forced the closure of major highways. Interstate 94 was closed from Mandan to the Montana line, a distance of 155 miles. Other major highways including 83, 52, 5, and 2 were made impassable and were shut down. The county sheriff in no fewer than 28 counties advised no travel as drifts were reported as deep as four feet. Snow plow operators were ordered off the roads as concern for their safety grew. National Guard soldiers were called out to rescue stranded motorists. Hundreds of motorists and occupants of three buses were rescued. Over a 23 mile stretch of Interstate 94, from Dickinson to Richardton, 100 vehicles with folks inside were stranded. In Dickinson snowplows accompanied emergency vehicles on calls. The storm was preceded on October 1 by temperatures in the 90s, as high as 96 at Beulah. Following the storm, on October 6, temperatures dropped into the teens and single digits above zero, as low as 4 degrees at Powers Lake. Berthold and Minot, to Towner. The heaviest snow was at Dunn Center, Manning, Marshall and Bow bells all with 22 inches, Beach with 20 inches, and Fairfield, Hebron, and Richardton all with 18 inches. Visibility dropped to zero for an extended period of
02/16/2006	Severe Cold/Wind Chill	Temperatures were in the 15 to 25 degree below zero range with wind speeds of 15 to 25 mph resulting in wind chills mainly in the 40s below. The lowest wind chills were -55 in Rolette County and -50 in Foster, Kidder, and Mountrail counties. Wind chill warnings were posted a full day in advance, on the 15th.

03/02/2007	Blizzard	<p>The winter storm system that brought heavy snow to West and Central North Dakota Wednesday February 28th (See Storm Data entries for February) through early Thursday March 1st, intensified as it moved towards and into Wisconsin later Thursday and Friday March 2nd. In addition to additional light snow accumulations (1 to 3 inches), strong northwest winds developed early Friday morning, and continued into Friday evening. Winds of 30 to 45 mph were recorded across central North Dakota for much of Friday. These winds, in combination with recent snowfall of 5 to 12 inches, created widespread areas of significant blowing and drifting snow with near zero visibilities. Conditions were much worse in the open country than they were within urban areas, as numerous rural roadways became impassable due to large snow drifts. As a result, no travel was advised for much of central North Dakota, along with several highways being closed including Interstate 94 from Bismarck to Fargo.</p> <p>Strong northwest winds with gusts in excess of 35 mph, reduced visibilities in blowing snow to 1/4 mile or less, and created treacherous road conditions with ice and snow cover. No travel was advised for much of Bottineau County, along with State Highway 43 closed.</p>
12/13/2008	Blizzard	<p>A significant winter storm impacted all of western and central North Dakota beginning Saturday, December 13th, and lasting through much of Sunday, December 14th. A blizzard warning was posted well in advance of the storm, with the warning lead time more than a full day in advance. The blizzard warning encompassed the entire National Weather Service Bismarck County Warning Area, 36 counties, all of which verified.</p> <p>Heavy snow and blizzard conditions, significant snow combined with very strong winds and near zero visibility, forced numerous road closures and the issuance of no travel advisories throughout Saturday and Saturday night. A statewide no travel advisory was then issued early Sunday morning by the North Dakota Department of Transportation. Conditions improved west to east later Sunday afternoon and into Sunday evening as snow ended and winds subsided. Wind chill warnings were then issued in the storm's wake, Sunday afternoon through Monday morning, for wind chill temperatures ranging from 40 below to near 55 below zero (See Storm Data entry for December 14 and 15).</p> <p>A significant upper level trough moved onshore into the Pacific Northwest Friday afternoon the 12th, and then deepened southeastward into the Intermountain West Friday night. This resulted in southwest flow aloft and large scale ascent spreading east-northeast towards the Northern Plains early on Saturday, as well as triggering lee-side cyclogenesis across the high plains of Wyoming. Surface low pressure then pushed east into the central plains Saturday afternoon and evening, coinciding with several shortwave impulses ejecting from the base of the upper trough and into North Dakota. Moderate to heavy snow spread across west and central North Dakota Saturday morning through Saturday night, then slowly dissipated west to east early Sunday morning through Sunday evening. Total snow amounts by Monday morning the 15th were as much as 13.8 inches at Williston. Bismarck had a foot, and six to eight inches of snow was common from Minot through Jamestown. The least amount of snow, two to five inches, fell across the far southwest and far south central areas, along the South Dakota border, and the far northeast, Rolette County.</p> <p>Strong north to northeast winds of 25-35 mph, with gusts to 40 mph, combined with the moderate to heavy snow, as well as the deep snow cover already of the ground, to create widespread blizzard conditions across all of western and central North Dakota.</p> <p>Winds of 25 to 35 mph, and gusts to near 40 mph, combined with falling snow and snow on the ground to create widespread and prolonged blizzard conditions. The storm total snowfall amount in Lansford was nearly five inches.</p>

01/11/2009	Blizzard	<p>A significant winter storm impacted all of western and central North Dakota beginning Sunday evening, January 11th, and lasting through the morning hours of Monday, January 12th. A blizzard warning was posted well in advance of this storm, with the warning lead time around twenty hours. The blizzard warning encompassed the entire National Weather Service Bismarck County Warning Area, 36 counties, all of which had a blizzard. Periods of light to moderate snow and blizzard conditions, very strong winds creating significant blowing and drifting snow and near zero visibilities, forced numerous road closures and the issuance of no travel advisories by law enforcement officials throughout the event. Conditions improved northwest to southeast later Monday morning as snow ended and the strong winds subsided.</p> <p>Strong surface low pressure developed across the high plains of Alberta during the day Sunday, then moved rapidly southeast across western and central North Dakota Sunday evening through early Monday morning. Isentropic upglide ahead of the surface low resulted in a band of light to moderate snow developing Sunday afternoon and evening west to east, with anywhere from one to five inches of snow being reported by Monday morning. The heaviest snow (three to five inches) fell from far northwest North Dakota through much of central North Dakota and into the James River Valley area.</p> <p>As this intense Alberta Clipper moved across the state Sunday night, strong northwest winds developed. Wind speeds were 25 to 45 mph sustained with gusts of 40 to near 60 mph for several hours. The strong winds combined with falling snow and abundant loose snow already on the ground to create a widespread and prolonged blizzard.</p> <p>Strong northwest winds of 25 to 35 mph, with gusts up to 45 mph, combined with falling snow and existing loose snow cover to create widespread and prolonged blizzard conditions across the county. Storm total snowfall accumulations by Monday morning ranged from one to four inches.</p>
03/23/2009	Blizzard	<p>A significant low pressure system developed in the lee of the Rocky Mountains over Colorado and Wyoming Sunday, March 22nd, strengthening and ejecting northeast into the upper Midwest by Tuesday, March 24th. Strong southerly flow ahead of this storm system brought ample Gulf of Mexico moisture all the way into southern Canada, setting the stage for significant precipitation accumulations across the region. Winter storm and blizzard watches and warnings were posted well in advance of the storm. Warning lead time averaged nearly 25 hours.</p> <p>Precipitation started in the form of rain and thunderstorms Sunday into Monday morning, before changing over to all snow west to east Monday afternoon through Tuesday morning. Additionally, strong northwest winds of 20 to 45 mph accompanying the snow, produced widespread blizzard conditions west during the day on Monday, then across central North Dakota Monday evening and into Tuesday morning. Further east, around the James River Basin area, winter storm warnings were in effect due to a wintry mix of rain, snow, and sleet and for lighter snow accumulations.</p> <p>Blizzard conditions continued across much of southwestern and central North Dakota on Tuesday, with conditions then gradually improving Tuesday night as the snow ended and the winds subsided. Storm total snow amounts ranged from 12 to 22.5 inches across southwest North Dakota, to five to 11 inches central. No travel advisories, road closures, power outages, and school and business closures were common during this significant spring storm.</p> <p>The cooperative observer at Newburg reported a storm total snow amount of ten inches. The heavy snow combined with strong northwest winds resulted in widespread blizzard conditions.</p>

12/25/2009	Blizzard	<p>A significant and prolonged winter storm impacted all of west and central North Dakota beginning Wednesday, December 23rd, lasting into Saturday, December 26th. Lead time was significant, as statements, watches, and warnings were posted well in advance of the storm.</p> <p>During the afternoon hours of Wednesday the 23rd, the first wave of snow moved into the region as a northern stream upper low dropped south into the Northern Plains from central Alberta, combined with a surface trough of low pressure pushing from west to east across the state Wednesday and Wednesday night. After a brief lull in snowfall intensity Thursday, this first system merged with a southern stream upper low over the central plains Christmas Eve night, and intensified as the merged system moved slowly northeast into the Midwest on Christmas Day. As this occurred, areas of snow redeveloped from east to west Thursday night into Friday. The main forcing mechanism for snow across west and central North Dakota during this second wave of snow was a persistent TROWAL (TRough Of Warm Air Aloft) which developed and resulted in the continuous generation of moderate to heavy snow bands over central and portions of western North Dakota early Christmas Day into Saturday.</p> <p>Additionally, already strong northerly winds of 20 to 30 mph Wednesday and Thursday increased on Friday, with gusts up to 45 mph developing across the state as surface low pressure retrograded northwest into western Iowa, resulting in a significant pressure gradient over the Dakotas. These strong winds accompanied the snow and produced widespread blizzard conditions over much of west and all of central North Dakota from Christmas Day through much of Saturday the 26th.</p> <p>The significant blowing and drifting of snow resulted in nearly impossible travel throughout the event, especially on the 25th and 26th when the strongest winds occurred. Numerous no travel advisories were issued from the North Dakota Department of Transportation, along with several road closures including all of Interstate 94 and portions of U.S. Highways 83 and 2. Needless to say, holiday commerce across west and central North Dakota was severely impacted by this intense storm system.</p> <p>See the winter storm entry from December 23, 24, and 25. Winds increased and gusted as high as 45 mph, and coupled with additional snow and blowing snow, resulted in near zero visibility. By 10:30 AM on December 25 the North Dakota Department of Transportation issued a no travel advisory for nearly the entire state.</p>
1/5/2010	Winter Storm, cold, extreme wind chill	<p>This event begins with 5-7 inches of snow followed by 30-35 mph winds. The winds produced near blizzard conditions resulting in numerous no travel advisories issued by county officials. The strong cold air combined with the strong winds resulted in wind chill temperatures of 40-55 below 0 Fahrenheit.</p>
1/19/2010	Winter storm	<p>This is the first phase of a 3 phase winter storm. It begin with a prolonged period of dense freezing fog which deposited thick layers of rime ice and hoar frost on power lines and other objects resulting in breaking power lines and power outages.</p>
1/22-23/2010	Winter Storm	<p>The second phase of the winter storm included freezing drizzle on the rime ice and hoar frost deposited by the previous freezing fog. Moderate to heavy wet snow fell during this phase.</p>

01/25/2010	Blizzard	<p>The third and final phase of an intense storm system (see Storm Data Entry for January 19-23) came on Sunday the 24th and Monday the 25th as the storm center started to pull out of the Northern Plains. As this occurred, areas of wrap around snow developed west and spread east, bringing several more inches of accumulation to the area. More significantly, wind speeds increased due to a strengthening pressure gradient and strong mixing, resulting in full blown blizzard conditions across much of North Dakota beginning in the west on Sunday and spreading east on Monday. Peak wind speed gusts at major reporting stations ranged from 45 to 55 mph over this two day period. These strong winds resulted in further power outages and delayed the repair of existing downed power lines. Conditions improved Monday night into Tuesday as the storm pushed through the Great Lakes region.</p> <p>Impacts from this event were substantial. Numerous no travel advisories were issued by state and county officials, and several roads were closed due to icy conditions and near zero visibilities. Numerous schools and businesses were also closed either due to the blizzard conditions which followed on the 24th and the 25th, or the widespread power outages. Preliminary damage assessments indicated that there was over 20 million dollars in total damages over west and central North Dakota due to this storm, with the majority of damages related to utility systems.</p> <p>Wind gusts up to 50 mph combined with falling snow and existing loose snow cover to create widespread blizzard conditions across Bottineau County.</p>
1/26/2010	Blizzard	<p>An intense storm system which developed across northern Minnesota brought widespread high winds and periods of blizzard conditions to west and central North Dakota on Tuesday, October 26, and Wednesday, October 27, 2010.</p> <p>In the early morning hours of October 26th, an area of surface low pressure ejecting out of the central plains rapidly intensified across central and northern Minnesota. This was in response to a very strong jet streak moving through the central plains, creating an area of high mid-level divergence over the upper Mississippi Valley region. The central pressure of the surface low continued to drop, with low pressure records being set across parts of Minnesota and Wisconsin. Over North Dakota on the back side of this low, a very strong pressure gradient developed as the surface low intensified, resulting in widespread high sustained winds of 40 to near 50 mph, and peak wind gusts to near 70 mph Tuesday into Wednesday.</p> <p>Wrap around precipitation developed underneath a strong TROWAL (TRough Of Warm Air aLoft) from the north to the south-southeast over the Dakotas, with precipitation changing from rain to snow as cold air was pulled into the system. When combined with the very high winds, widespread blizzard conditions developed across much of the state, with the worse conditions occurring Tuesday night and Wednesday morning. Storm total snowfall amounts were highest across the Turtle Mountain area, where up to thirteen inches was reported. The southern James River Valley received the least amount of snow, with only an inch reported.</p> <p>Impacts from this episode varied across the state. The high winds and blizzard conditions resulted in scattered power outages in both rural and urban areas, downed trees, some school closures, multiple traffic accidents, and numerous travel advisories and alerts issued by the North Dakota Highway Patrol and Department of Transportation.</p> <p>Sustained winds of 35 to 45 mph, and peak gusts in excess of 55 mph, combined with falling snow and snow on the ground to create widespread and prolonged blizzard conditions. Storm total snowfall amounts ranged from eight to thirteen inches, with the higher amounts occurring in Lake Metigoshe State Park</p>
12/15/2010	Ice Storm	<p>Very hazardous travel developed as a result of an extensive area of freezing rain and sleet. North Central ND was the hardest hit.</p>
12/20/2010	Heavy Snow	<p>Nine to twelve inches of snow occurred with gusty winds of up to 25 mph creating areas of blowing and drifting snow. Travel became hazardous and resulted in the issuance of travel advisories.</p>

1/31-2/01/2011	Extreme Cold/Wind Chill	Arctic high pressure pushed into the state, 15 mph winds along with subzero temperatures resulted in wind chill temperatures of 40-55 below 0 degrees Fahrenheit.
2/08/2011	Extreme Cold/Wind Chill	Arctic high pressure pushed into the state, 15 mph winds along with subzero temperatures resulted in wind chill temperatures of 40-50 below 0 degrees Fahrenheit.
02/17/2011	Blizzard	<p>Low pressure pushing across North Dakota brought strong winds and accumulating snow on February 17. While the strong winds impacted the entire local area, the accumulating snow was confined to the northwest and north central parts of the state. Although the storm total snow accumulations were only two to four inches, wind gusts up to 45 mph combined with the falling snow to result in a blizzard. Many roads were closed and numerous travel advisories were issued by county and state officials.</p> <p>Blizzard conditions developed as strong northerly winds up to 45 mph combined with falling snow and the fresh snow cover on the ground.</p>
03/11/2011	Blizzard	<p>A significant severe winter weather event occurred across much of west and all of central North Dakota March 11th through early March 12th.</p> <p>An Alberta Clipper rapidly intensified as it moved east-southeast into the Northern Plains in response to a strong upper level jet streak amplifying the clipper's associated mid-level trough. Warm air advection ahead of the clipper resulted in the initial precipitation type to fall as rain. As the precipitation was mainly orientated along the clipper's cold front, a quick transition from rain to all snow occurred with the frontal passage. Storm total snow accumulations with this storm ranged from two to five inches northwest and central.</p> <p>The main impact from this storm was the sudden onset and prolonged period of intense winds generated along and behind the cold front. Sustained winds in excess of 40 mph, with gusts to around 70 mph, developed west during the morning and spread east in the afternoon, then persisting through evening. When combined with the snow, severe blizzard conditions quickly became widespread, significantly impacting travel. In addition, temperatures initially above freezing fell into the 20s behind the front, turning wet and slushy roads into ice.</p> <p>Across southwest North Dakota, very little precipitation fell and the main impact was high wind.</p> <p>The violent and fast moving nature of this storm, combined with extremely icy road surfaces, resulted in dangerous if not impossible travel conditions in white out conditions. Numerous travel advisories and road closures were in effect, including the closure of Interstate 94 from Dickinson to Fargo, and Highway 83 from Bismarck to Minot. Several hundred motorists were stranded along minor and major roadways. Many accidents occurred. One in Sioux County involved injury. This blizzard caused unprecedented demand on law enforcement and emergency services, and required the North Dakota National Guard to be activated to assist in rescuing stranded motorists.</p> <p>Widespread blizzard conditions developed as strong northwesterly winds of 40 to 55 mph combined with falling snow and fresh snow cover on the ground. Travel was significantly impacted due to near zero visibilities, strong winds, and ice covered road surfaces.</p>

03/22/2011	Blizzard	<p>An upper level trough swinging into the Northern Plains combined with a strong low pressure system ejecting out of the Rockies and into the Central Plains, resulted in heavy snow and blizzard conditions across much of west and central North Dakota. This episode occurred from March 22nd into the 23rd.</p> <p>Warmer air surging north ahead of this storm system resulted in a wintry mix of rain, freezing rain, and sleet across much of the west and south central portions of the state at first, while all snow fell over the north central. Colder air pushing south eventually transitioned the precipitation to all snow. While there were some ice accumulations across the south, ice impacts were minor.</p> <p>Heavy snow fell from west central North Dakota, through much of the south central and James River Basin region. Storm total snowfall amounts within this band ranged from eight inches to one foot, with locally higher amounts including 18.2 inches near Beulah. In addition to the snow, wind gusts up to 45 mph developed across far northwest and all of north central North Dakota resulting in several hours of blizzard conditions.</p> <p>Numerous travel advisories and several road closures resulted from this storm, including the closure of Interstate 94 from Bismarck to Fargo, Highway 83 from Bismarck to the Canadian border, and Highway 2 from Berthold to Rugby.</p> <p>This was a prolonged and very complicated storm to warn for as potential was high for various types of warning criteria to be met.</p> <p>East winds of 35 to 45 mph combined with falling snow and existing snow on the ground to create several hours of blizzard conditions.</p>
4/02-03/2011	Heavy Snow	<p>Six to ten inches of snow were reported as a result of a deep area of low pressure moving into the Central Plains. Bottineau and Rolette Counties were hardest hit.</p>
04/30/2011	Blizzard	<p>A powerful late spring storm system swept across the Northern Plains region April 29th into May 1st. Significant amounts of moisture was drawn into the storm from the Gulf of Mexico, leading to heavy amounts of precipitation over west and central North Dakota. Strong cold air advection on the back side of the surface low resulted in a changeover from rain to freezing rain and eventually to heavy wet snow from west to east during this event.</p> <p>In addition, a tight pressure gradient and strong pressure rises on the back side of the surface low resulted in the development of very strong winds ranging from 40 to 60 mph across much of the region. Some reporting stations observed peak wind gusts in excess of 75 mph. Parts of western and north central North Dakota were hit the hardest, experiencing a prolonged period of very strong winds, freezing precipitation, and the heaviest snow of up to 14 inches. Impacts here were extreme and devastating, as the ice and heavy wet snow combined with the strong winds to knock down numerous trees and power lines, resulting in the loss of power to thousands, as well as stranding many motorists. Across the southwest and central impacts were less severe, however the widespread blizzard conditions still resulted in numerous road closures and travel advisories. Far south central and eastern North Dakota received very little snowfall but still experienced the high winds.</p> <p>A preliminary damage assessment by state officials documented an estimated 6.5 million dollars in damages, leading the North Dakota Governor to issue a State Disaster Declaration. Over 1,500 power transmission structures were damaged, and estimated livestock losses were more than 1,000. Also, one direct fatality and one direct injury were attributed to the storm near New England in Hettinger County, where a two-vehicle head on crash occurred due to low visibilities in the blizzard.</p> <p>See also storm data entries for May 2011.</p> <p>Several inches of heavy wet snow combined with winds gusting over 50 mph to result in widespread blizzard conditions across the county. Travel advisories were issued by county officials for all county roads due to the adverse conditions. This event continued into May 1st.</p>

05/01/2011	Blizzard	A powerful late spring storm system swept across the Northern Plains region April 29th through May 1st. Impacts were most significant over west central and northwest North Dakota.
1/18/2012	Extreme Cold/Wind Chill	An arctic air mass moved south resulting in air temperatures and wind chills to fall to 30 below zero and colder.
2/10-11/2012	Extreme Cold/Wind Chill	An arctic air mass moved south resulting in air temperatures and wind chills to fall to 30 below zero and colder.
2/25-26/2012	Heavy Snow	A Pacific Northwest storm brought six to nine inches of snow accompanied by gusty winds creating blowing and drifting snow.
01/11/2013	Blizzard	<p>A strong winter storm brought a wide variety of severe winter weather to the Northern Plains region the 11th and 12th.</p> <p>The first wave of winter weather arrived during the morning hours of the 11th in the form of light freezing rain. This resulted in a light coating of ice on roads making travel hazardous across west and central North Dakota. The precipitation eventually turned over to all snow later in the morning. A band of heavy snow developed early in the afternoon across south central North Dakota, extending north and east into the northern Red River Valley by early in the evening of the 11th. The snow ended from the west during the morning hours of the 12th. Up to six inches of snow fell over parts of south central North Dakota.</p> <p>Another area of heavy snow over eastern Montana on the 11th eventually developed east into northwest and north central North Dakota, where up to six inches of snow fell.</p> <p>In addition to the snow, strong north winds gusting to over 35 miles per hour at times created widespread blowing and drifting snow reducing visibilities during the evening of the 11th through the morning hours of the 12th. The worst conditions occurred over northwest and far north central North Dakota where blizzard conditions were observed for several hours.</p> <p>Northwest winds in excess of 35 miles per hour, combined with falling snow and existing loose snow cover on the ground, resulted in several hours of near zero visibilities.</p>
01/19/2013	Blizzard	<p>A strong cold front moving out of Canada and into the Northern Plains resulted in sustained winds to around 40 miles per hour and peak gusts to near 60 miles per hour over far north central North Dakota. The wind, combined with two inches of loose snow cover, resulted in a ground blizzard around the Turtle Mountain region on the 19th. To the west of this area, where there was very little loose snow cover, high winds were reported but no blizzard conditions.</p> <p>Sustained winds in excess of 35 miles per hour combined with loose snow cover to produce several hours of near zero visibilities.</p>
1/20/2013	Extreme Cold, Wind Chill	Subzero temperatures accompanied by winds up to twenty miles per hour dropped wind chill temperatures to 50 degrees below zero Fahrenheit.
1/30-2/01/2013	Extreme Cold, Wind Chill	Subzero temperatures accompanied by strong winds dropped wind chill temperatures to 55 degrees below zero Fahrenheit.

02/18/2013	Blizzard	<p>Low pressure tracking across far southern Canada brought moderate snow and strong northwest winds to North Dakota during the morning and early afternoon of February 18th. The worst conditions occurred over parts of north central North Dakota into the northern James River Basin, where one to four inches of snow combined with winds gusting to around 40 miles per hour. This resulted in blizzard conditions prompting the North Dakota Department of Transportation and the North Dakota Highway Patrol to issue no travel advisories from Rolla through Jamestown.</p> <p>Fresh snow of around two inches and existing loose snow on the ground combined with northwest winds gusting over 35 miles per hour to create a blizzard.</p>
02/19/2013	Extreme Cold, Wind Chill	<p>Subzero temperatures accompanied by winds up to 15 miles per hour dropped wind chill temperatures to 50 degrees below zero Fahrenheit.</p>
03/04/2013	Heavy Snow	<p>Heavy snow accompanied by winds up to 55 mph caused blowing and drifting snow resulting in reduced visibilities and blocked highways.</p>
12/06/2013	Extreme Cold/Wind Chill	<p>Subzero temperatures along with 15 mph winds brought the wind chill down to 50 degrees below 0 degrees Fahrenheit.</p>
12/28/2013	Blizzard, Extreme Cold/Wind Chill	<p>A potent Canadian storm moving south through the Northern Plains dragged a strong cold front across the region during the daytime hours of the 28th. Winds gusting to 50 miles per hour combined with falling snow and new snow accumulations of two inches to create a blizzard from the late morning across the north and into the evening across the James River Valley. Numerous no-travel advisories were issued by state and county officials as conditions deteriorated.</p> <p>Snow combined with northwest winds gusting to 50 miles per hour resulted in a blizzard during the afternoon. No travel was advised.</p> <p>Wind Chills dropped to 40 degrees below 0.</p>
01/03/2014	Blizzard	<p>A strong Alberta Clipper brought strong winds, mixed precipitation, and colder air to the Northern Plains January 3rd and 4th.</p> <p>Warm air spreading east ahead of the storm during the morning of the 3rd brought mainly freezing rain across much of western and central North Dakota. The freezing rain acted to harden the existing loose snow cover, and prevented blizzard conditions from occurring over a much larger area than what actually took place. Once colder air was pulled into the region precipitation changed to all snow.</p> <p>While snow was limited to no more than two inches, where the snow did fall it combined with winds in excess of 40 miles per hour to result in blizzard conditions. Locations impacted included southwestern North Dakota, north central North Dakota along and north of Highway 2, and the northern James River Valley.</p> <p>Winds gusting to forty miles per hour combined with falling snow to produce a blizzard. There were numerous reports of zero visibility received through social media.</p>
01/04/2014	Extreme Cold/Wind Chill	<p>Subzero temperatures as cold as 25 below along with 30 mph winds dropped wind chill temperatures to 45 degrees below 0.</p>
01/22-23/2014	Extreme Cold/Wind Chill	<p>Subzero temperatures along with 10-20 mph winds dropped wind chill temperatures to 62 degrees below 0.</p>

01/26/2014	Blizzard, Extreme Cold/Wind Chill	A baroclinic zone over western North Dakota moved slowly east across the state during the day on the 25th. Coupled with a mid-level shortwave trough up to three inches of snow fell over the area through the early evening. Gusty west to northwest winds developed during the evening hours of the 25th behind the front as it continued south and east. A secondary and much stronger cold front moved in during the morning hours of the 26th. Additional light snow and high winds over 50 miles per hour accompanied the front, with strong winds continuing through the afternoon. A peak wind gust of 68 miles per hour was reported near Crosby, Divide County. Blizzard conditions on the 26th were common where snow accumulated during the day on the 25th, and where additional snow fell during the morning of the 26th. Interstate 94 was closed from Bismarck to Fargo, and Highway 83 was closed from Bismarck to Minot due to zero visibilities and numerous accidents. All of northwest, central, and eastern North Dakota was under no travel advisories that were posted by transportation officials. While very little snow fell across the southwest, winds were still high, gusting to around 60 miles per hour. Winds gusting to around 55 miles per hour combined with fresh snow on the ground and falling snow to produce a blizzard. Wind Chill temperatures of 45 degrees below 0 were recorded.
02/28/2014	Extreme Cold/Wind Chill	10 mph winds and subzero temperatures dropped wind chill temperatures as low as 45 degrees Fahrenheit below zero.
03/01/2014	Extreme Cold/Wind Chill	10 mph winds and subzero temperatures dropped wind chill temperatures as low as 45 degrees Fahrenheit below zero.
12/01/2014	Extreme Cold/Wind Chill	17 mph winds and subzero temperatures dropped wind chill temperatures as low as 45 degrees Fahrenheit below zero.
01/02/2015	Heavy Snow	Six to eight inches of snow fell over the county as a result of a clipper system moving through the State.
01/03/2015	Extreme Cold/Wind Chill	Temperatures of 24 degrees below along with 25 mph winds produced wind chills as low as 50 degrees Fahrenheit below 0.
02/22/2015	Extreme Cold/Wind Chill	Temperatures of 30 degrees below along with 15 mph winds produced wind chills as low as 50 degrees Fahrenheit below 0.

Source: National Climatic Data Center, <http://www.ncdc.noaa.gov/stormevents/>, NWS Bismarck

Table 4.12.3B Bottineau County Winter Weather Declared Disasters and Emergencies

Declaration	Location	Date	Other Information	Casualties ¹	Damages ¹
DR 1157	Bottineau County (and all other counties in the state)	January 2-31, 1997	Public Assistance. For blizzards and severe winter storms.	8 deaths 91 injuries	\$14,801,246* \$317,000,000 estimated total
DR 1279	Bottineau County (and 36 other counties / tribes)	March 1 – July 19, 1999	Public Assistance and Individual Assistance. For snow and ice. Also included impacts from severe storms, tornadoes, flooding, ground saturation, landslides, and mudslides.	None	\$124,391,622*~

¹ Damages are statewide

* Federal Share (includes Individual and Family Grant, Disaster Housing, Manufactured Housing, Crisis Counseling Immediate and Regular Programs, Disaster Unemployment Assistance, Hazard Mitigation Grant Program, Public Assistance, FEMA Mission Assignments, and SBA Home, Business, and Economic Injury Loans).

~ Primarily includes flood impacts.

Source: North Dakota Department of Emergency Services, 2015.

4.12.4 Probability and Magnitude

Table 4.12.4A is a graphical representation of the range of events that can occur within the winter weather hazard. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from winter weather hazard. The impact categories and additional information are discussed in additional detail at the beginning of this Risk Assessment Chapter.

Table 4.12.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				Extreme Isolation and Power Outages Statewide
	<i>No local history</i>				
	<i>100 years</i>			Long Duration Blizzard	
	<i>50 years</i>	Heavy Snow	Winter Road Closures/Outage		
	<i>Annually</i>				
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

From January 1996 to present day, 31 blizzards, 26 extreme cold events, 8 heavy snow or winter storm events, and 1 ice storm occurred. Table 4.12.4B shows the associated probabilities based on this historical record.

Table 4.12.4B Winter Weather Recurrence Intervals

Winter Weather Type	Recurrence Interval (estimated)
Blizzard	1.5 events/year
Extreme Cold	1.3 events/year
Heavy Snow or Winter Storm	.5 event/year
Ice Storm	0-1 event/year
Any of the Above	2-4 events/year

The severe blizzards and winter storms that result in the loss of life, extended road closures, long-term power outages, or significant isolation problems represent high magnitude winter weather events for Bottineau County. Blizzard conditions continuing for 2 or more days and blocked roadways or power outages for a week or more both represent extreme winter weather conditions that are possible. These types of events present significant transportation, sheltering, and logistical challenges.

North Dakota’s Living Snow Fence Initiative may help reduce future vehicle accidents and casualties caused by severe winter weather events. Living snow fences consist of trees and shrubs strategically placed to trap

snow and prevent it from blowing across roadways and into underpasses. These plantings are typically located in the former locations of man-made snow fences installed by NDDOT District Engineers. The 1996/1997 winter storms illustrated the fact that the existing snow fence setback of 165 feet from the centerline of the road was inadequate. This distance was subsequently increased to 200 feet, and the added snow catch area provided by this change was needed during the 2008-2009 winter season.

4.12.5 Risk Assessment

Vulnerability Overview

The population of Bottineau County is most threatened by winter weather while driving or when electric service is lost. Transportation accidents and stranded vehicles are more common during poor road and visibility conditions and may result in injuries or death. Property losses are usually covered by insurance. In Bottineau County, Electricity, Fuel Oil, and Propane are the most common home heating methods as depicted in Table 4.12.5A.

Table 4.12.5A Method of Heating Houses or Condos

Heating Fuel	Percent of homes	Number of Houses or Condos
Bottled, Tank, or LP gas	35.9%	1,675
Electricity	39.2%	1,829
Fuel Oil, kerosene	19.1%	891
Coal or Coke	0.8%	37
Wood	3.4%	159
Other	1.6%	76
TOTAL	100.00%	4,667

Table 4.12.5B Method of Heating Apartments

Heating Fuel	Percent of homes	Number of Apartments
Bottled, tank, or LP gas	25.1%	134
Electricity	52.1%	278
Fuel Oil, kerosene	19.9%	106
Wood	0.9%	5
Others	2.0%	11
TOTAL	100.00%	534

Source: http://www.city-data.com/county/Bottineau_County-ND.html

This makes electricity an important resource for home heat during severe winter weather. If electricity is lost due to a power outage, it may become a life threatening situation. In addition, electricity is still needed to run the blowers and heating systems regardless of the type of heat. Therefore, an extended power outage during winter may make many homes and offices unbearably cold. Additionally, during extended winter-time power outages, people often make the mistake of bringing portable generators inside or not venting them properly, leading to carbon monoxide poisoning. With poor road conditions, sheltering residents may present significant logistical challenges with getting people to heated facilities, feeding, and

providing medical care. These situations, accompanied by stranded motorists that need to be rescued, represent significant threats to the population. As history has demonstrated, poorly built structures may also experience structural collapses resulting in property losses.

With respect to the economy, agriculture, transportation, and businesses in general may be affected. Winter is not a peak growing season, so agriculture may not be severely affected unless the storms arrive early or late in the growing season. The primary exceptions for agriculture are extreme cold temperatures during calving operations and keeping animals hydrated during blizzards. Ranchers must take precautions not to lose large numbers of calves and livestock during cold and snowy weather. This could have an impact on agricultural profits. Winter storms may slow transportation resulting in business closures and delivery delays. Schools often close temporarily if conditions warrant.

Perhaps the greatest threat to historical values from winter weather is the potential for pipes to freeze and burst during cold weather. Water can easily damage the interiors of structures and their contents, including items of historic value. When roads are impassable, social events may also be postponed or cancelled. The Bottineau County cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City have adequate shelters identified to shelter their populations should the need arise. The townships’ population is mainly farmers and rural residences especially in the Turtle Mountains who are deemed to be self-sufficient should a winter storm power outage occur. Most farmers and rural resident populations have standby generators to provide electricity to their homes and farming operation during a winter storm power outage.

To refine and assess the relative vulnerability of Bottineau county to winter storm events, ratings were assigned to pertinent factors that were examined at the county level. These factors include: social vulnerability index, prior events, prior annualized property damage, building exposure valuation, population density, livestock exposure, crop exposure, and annualized crop loss. A rating value of 1-10 was assigned to the data obtained for each factor and then weighted equally and factored together to obtain overall vulnerability scores. The Social Vulnerability Index normally ranges from 1-5. To give the Social Vulnerability Index the same weight as the other factors, the numbers were multiplied by two. Overall vulnerability scores were sorted into rankings from low, low-moderate, moderate, moderate-high, and high. Table 4.12.5C summarizes the calculated ranges applied to determine the overall vulnerability ranking based on the scores which ranged from 10 through 39.

Table 4.12.5C Rankings for Overall Severe Winter Storm Vulnerability

Low	Low-Moderate	Moderate	Moderate-High	High
10-15	16-21	22-27	28-33	34-39

The following are the data sources for the rating factors: Social Vulnerability Index for Bottineau County from the Hazards and Vulnerability Research Institute at the University of South Carolina, National Climatic Data Center (NCDC) storm events (2000-2012), U.S. Census Bureau (2010), USDA’s Census of Agriculture (2007), and the USDA Risk Management Agency (2003-2012). Table 4.12.5D shows the vulnerability ranking for Bottineau County derived from the analysis of data from these sources. The overall vulnerability score is moderate for Bottineau County, based on the rankings above.

Table 4.12.5D Bottineau County Winter Storm Vulnerability Ranking

Social Vuln. Rating	# of Events (2000- 2003)	Property Damages	Annual Property Damage	Total Building Expos. (\$000)	Pop. Density	Livestock Expos.	Crop Expos .	Crop Insurance Payments (2003-2012)	Crop Losses (2003- 2012)	Annual Crop Losses	Vuln. Score
10	72	\$130,000	\$10,000	\$974,645	3.9	\$8,891,000	\$158,9 91,000	\$24,969	\$28,055	\$2,806	25

Source: State of North Dakota 2014 Multi-Hazard Mitigation Plan

To compare the vulnerability of the Bottineau County cities, Bottineau is the most vulnerable because it has a large number of vulnerable population facilities as outlined in Table 4.12.5E. The other cities are equal in vulnerability.

Figure 4.12.5E Vulnerable Populations

Facility Name	Type	Location	Population
St. Andrew’s Health Center	Hospital	Bottineau	25 Bed
St. Andrew’s Health Center Apts.	Living	Bottineau	14 Apartments
Good Samaritan Nursing Home	Living	Bottineau	65 Beds
Bottineau Public Schools (K-12)	School	Bottineau	651 Students
Westhope Public Schools (K-12)	School	Westhope	70 Students
Dakota College	College	Bottineau	169 On-Campus Students
Oak Manor	Living	Bottineau	30 Apartments
Janet Bechtold	Daycare	Bottineau	18 Children
Charlotte Bedlion	Daycare	Bottineau	18 Children
Heather Belcourt	Daycare	Bottineau	17 Children
Jodi Gustafson	Daycare	Bottineau	16 Children
Cindy Lagasse	Daycare	Bottineau	10 Children
Patty Monson	Daycare	Bottineau	18 Children
Louise Schneiderman	Daycare	Bottineau	9 Children
Rachael Stewart	Daycare	Bottineau	15 Children
Candace Trottier	Daycare	Westhope	12 Children
Samantha Werner	Daycare	Newburg	18 Children
Lupe Wuster	Daycare	Bottineau	15 Children
Ann Zorn	Daycare	Bottineau	18 Children
Building Blocks Learning Center	Center	Bottineau	65 Children
Sandra Anderson	Family Provider	Lansford	9 People
Lynette Dubois	Self-Declared	Bottineau	5 Children
Nancy Erickson	Self-Declared	Westhope	5 Children
Agnes Schumacker	Self-Declared	Westhope	5 Children

Note: Day care population shown is capacity.

Sources: Bottineau County Emergency Manager, ND Department of Public Instruction, and http://childcarecenter.us/north_dakota_homecare/bottineau_nd_county#.VSwVek10y70

Loss Estimates

Based on NCEM event narratives, typical losses due to severe winter weather include livestock injury and death, crop loss, vehicle accidents, downed power lines and utility poles, power outages, damaged and collapsed roofs, delayed traffic and commerce, frozen pipes, and human fatalities or injuries due to exposure or vehicle accidents. Damages from severe winter storm events in Bottineau County included \$130,000 in property damages, with no direct deaths or injuries reported. Based on these numbers, Bottineau County could expect roughly \$10,000.00 in average annual property damages from severe winter storms.

As mentioned previously, total crop insurance payments for insurable crops due to winter weather in Bottineau County totaled \$28,055 between 2003 and 2012. According to the 2011 North Dakota Crop Insurance Profile Report issued by the USDA Risk Management Agency, 89 percent of North Dakota insurable crops were insured in 2011. Therefore, the crop insurance payments have been extrapolated to estimate losses to all insurable crops. Extrapolated crop losses due to cold winter from 2003-2012 totaled \$24,969, or about \$2,806 annually. (Risk Management Agency, 2003-2012)

4.12.6 Critical Facilities in Hazard Prone Areas

Most structures usually remain unaffected by winter weather with the primary exceptions being heavy snow loads, frozen pipes, or other utility failure. Should the weight of the snow on the roof of a state-owned building or critical facility exceed its structural capability, the roof could collapse.

The critical facilities themselves generally are not threatened by winter weather events. Heavy snow loads on roofs, particularly large span roofs, can cause roofs to leak or even collapse depending on their construction. Extremely cold temperatures may cause pipes to freeze and subsequently burst, causing water damage. Probably the greatest issue for critical facilities during significant winter weather is the inaccessibility of such facilities due to poor roadways, utility outages, or dangerous wind chills. First responders such as fire, law enforcement, and ambulance may have a difficult time responding during poor road conditions or may not be able to provide certain services during electric outages. Those facilities with back-up generators are better equipped to handle a winter storm situation should the power go out.

Winter weather does pose a threat to critical infrastructure. Above ground power and telephone lines can be taken out by falling tree branches or thick ice accumulations. Following severe ice storms, power may take weeks to be restored. Water infrastructure may also be threatened by winter weather, particularly rapid freeze and thaw periods that cause underground water mains to burst. This could result in temporary disruptions of running water. The most difficult network to maintain is the road infrastructure. During periods of heavy snow, ice, or blizzards, roads can quickly become impassable, stranding motorists and isolating communities. Long term road closures during an extended cold period may diminish and threaten propane and fuel supplies.

Table 4.12.6A Electrical Providers

	North Central Electric Cooperative	Ottertail Power
Antler		X
Bottineau		X
Gardena		X
Kramer		X
Landa		X
Lansford		X
Maxbass		X
Newburg		X
Overly	X	
Souris		X
Westhope		X
Willow City		X
Rural Bottineau County	X	

4.12.7 Development in Identified Hazard Areas

Winter weather generally does not affect structures, but in some cases, heavy snow and ice can cause structural damages. Therefore, the vulnerability of future development depends on the integrity of the new construction. Those jurisdictions enforcing building codes reduce the vulnerabilities of future development from winter weather through those codes. Those jurisdictions lacking building codes could theoretically have new construction occur that is unable to withstand heavy snow and ice loads.

4.12.8 Data Limitations and Other Key Documents

The data limitations related to the winter weather hazard include:

- Lack of a countywide, multi-agency, historic winter weather database containing information on the winter weather conditions (snow depth, temperature, wind, snowfall rates, water content, and duration) and the associated problems (number of accidents, conditions of roadways, and services needed).

Other key documents related to the Winter Storm hazard include the North Dakota Emergency Operations Plan.

4.13 Geologic Hazards

Including Landslide, Earthquake, and other Geologic/Mining Hazards

Frequency	Unlikely	Less than 1% probability in a given year
Impact	Minor	1%-10% of jurisdiction affected
Risk Class	2	Minor Hazard
Seasonal Pattern	None	
Duration	Minutes to weeks	
Speed of Onset	Minimal warning	

4.13.1 Description

Geologic hazards in Bottineau County usually do not cause severe damage, as other hazards may, but the potential exists for the occasional landslide, earthquake, or mine collapse (gravel pit) that causes some loss.

Landslide

A landslide is the 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 ground-water levels on primarily steep slopes, earthen dams, and the banks of lakes, reservoirs, canals, and rivers (US Geological Survey). Other causative factors include steepening of slopes by erosion or construction, alternate freezing or thawing, earthquake shaking, volcanic eruptions, and the loss of vegetation from construction or wildfires. The saturation or destabilization of a slope allows the material to succumb to the forces of gravity or ground movement.

Many different types of landslides exist: slides, falls, topples, flows, and lateral spreads. Slides involve the mass movement of material from a distinct zone of weakness separating the slide material from the more stable underlying material. The primary types of slides are rotational slides and translational slides. Falls occur when materials, mostly rocks and boulders, fall abruptly from a steep slope or cliff. Falls are strongly influenced by gravity, mechanical weathering, and the presence of interstitial water. Topples are similar to falls, yet they pivot around a connection point at the base of the material and are most often caused by gravity or fluids in the cracks of the rocks. Flows typically have a higher percentage of water material embedded in them and behave more like a liquid than other types of landslides. The five primary categories of flows are: debris flows, debris avalanches, earthflows, mudflows, and creeps. Lateral spreads usually occur on gentle slope or flat surfaces when liquefaction occurs and leads to fractures on the surface. Complex landslides involve any combination of these types (US Geological Survey).

Landslides are typically associated with mountainous regions, but they can also occur in areas of low relief. In these areas, the landslides are often the result of cut-and-fill failures (from roadway and building excavations), river bluff failures, lateral spreading, or mine collapse (US Geological Survey).

Landslides may occur in natural and anthropogenic settings in Bottineau County and are most commonly found within the Souris River Valley, in the hilly areas of the Turtle Mountains, and on engineered slopes along major transportation corridors. (North Dakota Geological Survey).

Riverbank slumping can be considered a form of landslide and may be found along the rivers in Bottineau County. The riverbank soils are inherently weak, and natural forces are always moving river channels. Urbanization may artificially accelerate riverbank slumping and instability through activities such as placing homes and structures too close to the riverbank in a way that adds pressure to the bank and increases soil hydration through increased storm water runoff, using irrigation systems that saturate the soil and decrease its strength, adding weight to the riverbank with structures, retaining walls, and riprap, and planting shallow-rooted vegetation. Minimizing these types of activities and placing structures away from riverbanks can mitigate some, but not all, riverbank slumping (Cass County, 2010). Currently riverbank slumping is not considered an issue in Bottineau County yet there is a potential that some structures exist that could be subject to riverbank slumping.

Earthquake

An earthquake is the sudden movement of the Earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth's surface. Huge plates slowly move over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, thus, producing an earthquake (US Geological Survey).

On Monday, July 8, 1968 the State Capitol Building trembled just a little. Governor William L. Guy's secretary thought there had been a sonic boom. Others in town reported that coffee had sloshed from their cups. Most people, however, apparently had not felt or recognized the tremor for what it was - an earthquake. The quake had an epicenter a few miles southwest of Huff, North Dakota and it was felt over a 3,000-square-mile area. The effects of the earthquake, which included rattled dishes and windows and wood frame houses that creaked, were felt in Huff, Bismarck, and several other central North Dakota communities.

Newspaper reports and records from the U.S. Geological Survey's National Earthquake Information Center include information on at least 12 additional earthquakes that have been felt in North Dakota. Perhaps the most widely felt earthquake in North Dakota was a May 15, 1909 shock that rocked the northern Great Plains at about 9 p.m. That tremor had an epicenter near Avonlea, Saskatchewan, near the Montana-North Dakota-Saskatchewan border. It broke dishes and windows and cracked plaster and masonry. The Avonelea earthquake was felt throughout North Dakota and western Montana as well as in the adjacent Canadian Provinces.

The most widely felt earthquakes in U.S. history may also have been felt in North Dakota. Known as the New Madrid quakes, after the unfortunate town of New Madrid in extreme southeastern Missouri, a series of three strong quakes (and hundreds of smaller ones) occurred on December 16, 1811, January 23, 1812, and February 7, 1812. The largest of these tremors was felt from Canada to the Gulf of Mexico, and from the Rockies to the Atlantic coast. The potential remains for another devastating earthquake in the New

Madrid area.

Other earthquakes that have been felt in North Dakota include one in southeastern North Dakota in 1872; Pembina in 1900; three in the Williston area in 1915, 1946, and 1982; the Hebron area in 1927; near Havana in 1934; and the Selfridge area in 1947. Earthquakes centered near Morris, Minnesota were felt in southeastern North Dakota in 1975 and 1993.

Almost all earthquakes are caused by the sudden slip of a fault in the upper few hundred kilometers of the earth. Most occur at the boundaries between the seven large plates which fit together to form the earth's outermost shell. These plates are constantly in motion, in some places pulling away from one another as at spreading centers such as the mid-Atlantic Ridge, sliding past one another such as along the San Andreas Fault in California, or colliding headlong into one another, such as at the Andean or Himalayan Mountains. These great plate movements are only on the order of 1-10 mm/yr. (about the rate at which your fingernails grow), but continual slow movement causes stresses to build up. When stresses exceed the strength of the rocks, the rocks break and snap into a new position. The area of rupture is known as the focus or hypocenter of an earthquake and the epicenter is the point on the surface of the earth directly above the focus. The process of breaking or faulting creates vibrations called seismic waves; we feel these waves as earthquakes.

Seismic waves, from the Greek seismos meaning earthquake, actually consist of both surface waves and body waves. Body waves travel deep into the Earth's mantle and even through its core before reaching the surface, while surface waves travel near the Earth's surface.

The seismic waves of large earthquakes can induce natural oscillations in the Earth and cause the entire planet to ring like a bell for hours or even days. The tone is too low for us to hear, but seismographs can record these low frequency oscillations. It is interesting to record the seismometer signal on a magnetic tape and play back the tape, say, at 10,000 times faster. We can then, as it were, listen to the earth. It is a strange experience. Generally, it sounds like being in a forest on windy day, with occasional brief falling tones and longer rather melodic tones, reminiscent of an orchestra tuning up. Every now and again there are sharp noises that sound like a branch breaking. On rare occasions there are sounds like a herd of animals stampeding through a forest, smashing off branches and breaking them underfoot.

Most earthquakes that originate in North Dakota are likely related to deeply buried structures in the Precambrian basement. In extreme southwestern North Dakota, under sedimentary rocks of the Williston Basin, geologists have recognized the Wyoming Craton. The Superior Craton underlies eastern North Dakota. These two cratons, extremely old and deformed, but geologically stable regions, are separated by the Western Dakota Mobile Belt, a group of slightly younger rocks that were caught between the cratons as they collided during the Precambrian. Numerous faults probably exist within these ancient, highly deformed ancient rocks, but because they are so deeply buried, their existence is speculative. Two long faults have been postulated within the Western Dakota Mobile Belt: the Tabbemor Fault and the Thompson Boundary Fault. Movement on any of these postulated faults could produce small to moderate tremors.

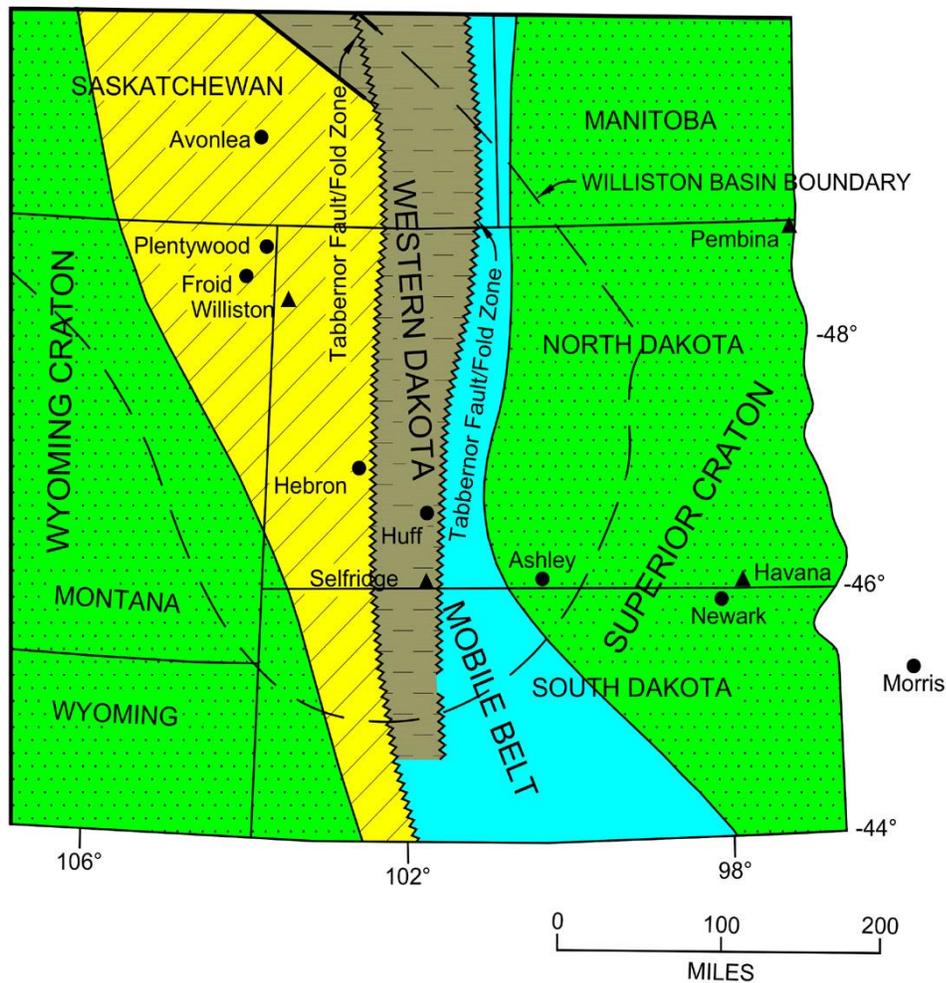


Figure 4.13.1A: Map showing the main basement geologic structures in North Dakota and the surrounding area. The map shows the major Precambrian Structural provinces (Superior Craton, Western Dakota Mobile Belt, and Wyoming Craton). Two deep faults, the Thompson Boundary Fault and the Tabernor Fault/Fold Zone, extend north-south through the Western Dakota Mobile Belt in western North Dakota. All of these features are deeply buried beneath younger materials throughout the area.

Localities where earthquakes have occurred are noted on the map (round dots). Additionally, earthquakes have been reported felt at the locations shown by triangles.

All of the features shown on the map are buried beneath younger materials throughout the area and, because they are hidden and cannot be studied directly, the map is speculative. Other structural maps of the area, compiled by other geologists, differ from this one in various ways.

Small tremors can also occur when layers of sedimentary rock collapse into voids left by the dissolution of underlying salt beds. Northwestern North Dakota is underlain by thick and extensive salt deposits at depths ranging from about 4,000 to 12,000 feet. Salt is a geologically unstable mineral, readily dissolved in water, and when burdened under the tremendous mass of overlying sediments, it can actually flow and deform. As the salt moves, the support for overlying layers is removed. These layers can settle downward gradually

or collapse suddenly, creating a comparatively shallow, small earthquake.

Few seismograph stations are located in the Midwest because it is, geologically speaking, comparatively stable. There are no seismographs in North Dakota or Minnesota. A seismograph located at the northern end of the Black Hills, originally installed jointly by the U.S. and former Soviet governments to monitor nuclear testing, is now operated by the U.S. Geological Survey. The Canadian federal government operates a station at Flin Flon, Manitoba, and the University of Manitoba operates a station at Winnipeg. An industrial research seismograph is located at Pinawa, Manitoba, about 120 km east of Winnipeg.

Earthquakes with a magnitude of about 4.5 or greater can be recorded by seismographs all over the world. The seismic waves of smaller tremors dissipate before being recorded by distant instruments on the other side of the globe. For an earthquake with an epicenter in central North Dakota to be recorded by the nearest seismograph stations just mentioned, it would have to have a magnitude of about 3.3 or greater. The 1968 Huff earthquake remains the only tremor with an instrumentally verified epicenter in North Dakota, although it is likely that other small reported tremors have had epicenters within the state. After all, it has only been since the early 1960s that a seismograph network has been set up in the Upper Midwest to record such small earthquakes. Furthermore, tremors of Richter magnitude 3.0 and sometimes less are often felt by persons favorably situated. There could, in other words, be more small tremors in the state than instrumentally verified records would suggest.

North Dakota is located in an area of low earthquake probability. Infrequent, small earthquakes may occur near or within the state, but it is unlikely they will cause any serious damage.

Source: <https://www.dmr.nd.gov/ndgs/ndnotes/Earthquakes/>

Bottineau County is not an area known for its earthquake activity, however, hundreds of miles to the west in the Rocky Mountains is the Intermountain Seismic Belt and to the southeast is the New Madrid Seismic Zone. Neither of these areas is close enough to cause significant damages in the state, however, relatively small earthquakes may occur in areas not recognized for regular earthquake activity. One area, termed the Western Dakota Mobile Belt, may have two deeply buried faults, the Tabbemor Fault and Thompson Boundary Fault; both are postulated and may be capable of producing small to moderate earthquakes. The area is shown in Figure 4.13.1A (North Dakota Geological Survey).

Geologists primarily measure earthquake severity in two ways: by magnitude and by intensity. Magnitude is based on the area of the fault plane and the amount of slip. The intensity is based on how strong the shock is felt and the degree of damage at a given location. The most commonly used scales are the Richter magnitude scale, moment magnitude scale, and modified Mercalli intensity scale (National Earthquake Hazards Reduction Program)

4.13.2 Geographic Location

An ongoing project at the North Dakota Geological Survey is the identification and mapping of

landslide areas of the state, called the Landslide Inventory Mapping Program. As of 2010, 8,856 individual landslides and roughly 20% of the state were mapped in North Dakota. There is a low landslide incidence and susceptibility rating for Bottineau County (less than 1.5% of area).

There are no recorded historical earthquakes in Bottineau County. The peak horizontal acceleration (as a percentage of gravity) that has a 2% probability of exceedance in 50 years is 0-2%g for Bottineau County (USGS). As a measure of how hard the ground shakes, the higher the value, the greater the hazard. When viewed on the national scale, the North Dakota values are very low, and Bottineau County is in the lowest rating category for the state. An expected acceleration of 0-2%g has perceived shaking of not felt to light, and no potential damage. (Pacific Northwest Seismic Network 2010)

In Bottineau County, this would include the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City.

4.13.3 Previous Occurrences

Most geologic events in North Dakota go unnoticed or result in very little physical damage. Most landslide damages that do occur are to transportation infrastructure and lead to impacts such as road closures, detours, and road repairs. Occasionally, structures are involved.

A NDDOT report stated that some climatologists believe that the state is in a wet cycle that could potentially last up to 30 years. North Dakota landslides are in part caused by excessive ground moisture from the record snowfalls and rainfalls in this wet cycle. (Source: TransAction III Topic Summaries, North Dakota’s Statewide Strategic Transportation Plan)

Table 4.13.3A lists Bottineau County disaster declarations resulting from geologic hazards, which included landslides and mudslides in the declaration.

Table 4.13.3A Bottineau County Geologic Declared Disasters

Declaration	Location	Date	Magnitude	Casualties ¹	Damages ¹
DR 1279 (for Severe Storms, Tornadoes, Snow and Ice, Flooding, Ground Saturation, Landslides, and Mudslides)	Bottineau County (and 45 other counties/ tribes)	6/8/1999 (incident period 3/1/1999 through 7/19/1999)	Not Reported	Not Reported	Disaster assistance over \$100 million

¹ Damages are statewide
 Source: North Dakota Department of Emergency Services, 2014.

Perhaps the most widely felt earthquake in North Dakota was a May 15, 1909 shock that rocked the northern Great Plains at about 9 p.m. That tremor had an epicenter near Avonlea, Saskatchewan, near the Montana-North Dakota-Saskatchewan border. It broke dishes and windows and cracked plaster and masonry. The Avonelea earthquake was felt throughout North Dakota and western Montana as well as in the adjacent Canadian Provinces.

4.13.4 Probability and Magnitude

Figure 4.13.4A is a graphical representation of the range of events that can occur within the geologic hazards. Generally, the more frequent events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the geologic hazards. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Table 4.13.4A Hazard Frequency and Impact Ranges

Frequency	<i>No regional history</i>				
	<i>No local history</i>				
	<i>100 years</i>		Landslide		
	<i>50 years</i>	Earthquake	Damaging Roads		
	<i>Annually</i>	Shaking Felt			
		<i>Negligible</i>	<i>Limited</i>	<i>Critical</i>	<i>Catastrophic</i>
		Impact			

Generally, the more frequent geologic hazard events have a low impact, and the high impact events occur less frequently. All types of events may not appear in the figure, but the information presented can assist when comparing hazards (high frequency, low impact events versus low frequency, high impact events) or when assessing the range of magnitudes possible from the geologic hazards. The beginning of this risk assessment chapter provides additional information on frequency and impact ratings.

Earthquake experts use probabilities when determining the seismicity of an area. Peak horizontal acceleration is the maximum horizontal acceleration experienced by a particle during the course of the earthquake motion. When acceleration acts on a physical body, the body experiences the acceleration as a force. Gravity is a commonly known force of nature, and therefore, the units of acceleration are measured in terms of g, the acceleration due to gravity. The peak ground acceleration with a 2% probability of exceedance in 50 years in Bottineau County is less than 2%g (US Geological Survey). To make sense of these values, at 1.4%g-3.9%g, the earthquake is felt by few and potential damage is none.

4.13.5 Risk Assessment

Vulnerability Overview

The primary threats to Bottineau County jurisdictions from the geologic hazards are to county, city, and township road systems and potentially structures. Landslide poses the greatest threat of the geologic hazards. Roadways may crumble or be buried following a landslide. Should buildings be located in such areas, losses could occur. Roads that are in the Turtle Mountains and in the Souris River Valley are most at risk. The cities in the county are at very low risk.

Given the incompleteness of the landslide data, the hazard ratings are only broken into three levels:

- High – several areas of the county have identified landslide hazard areas
- Moderate – isolated areas of the county have identified landslide hazard areas
- Low – none of the county has identified landslide hazard areas

The earthquake rating was based on the potential peak horizontal acceleration with a 2% probability of exceedance in 50 years as follows:

- High – 8-10%g
- Moderate-High – 6-8%g
- Moderate – 4-6%g
- Low-Moderate – 2-4%g
- Low – 0-2%g

The overall geologic hazards rating is based on the combination of the landslide and earthquake hazards, with more weight given to the landslide hazard. Based on the 2014 North Dakota Multi-Hazard Mitigation Plan, Bottineau County has a “Low” landslide and earthquake rating, and therefore a “Low” overall rating for geologic hazards risk to the county and jurisdictions.

Loss Estimates

The 2011 North Dakota landslides cost \$5.6 million in emergency repairs and an estimated \$14 million in permanent repairs for a total of nearly \$20 million. Although these types of losses do not occur every year, similar losses are possible in any year when similar flood conditions are present.

4.13.6 Critical Facilities in Hazard Prone Areas

Most critical facilities and infrastructure in Bottineau County are likely located outside of geologic hazard areas, such as landslide. The primary exception may be transportation infrastructure.

4.13.7 Development in Identified Hazard Areas

Existing and future development may be vulnerable to geologic hazards. Specific to landslide, most land use regulations in the county do not directly address the landslide hazard, however, some may restrict development on excessive slopes and soil types that are inherently more prone to landslides. Earthquake losses can often be mitigated through building codes. Those jurisdictions enforcing building codes reduce the vulnerabilities of future development from earthquakes through those codes. New and future development in those jurisdictions that have adopted and enforce the state building code should be better able to withstand extreme winter weather. Bottineau County is not considered a “High” or “Moderate-High” geologic hazard jurisdiction.

Increased populations add to the challenges of managing development in geologic hazard areas, especially in locations where landslide mapping has not been completed. Bottineau County has not seen a dramatic

population increase, yet their community numbers are stable or slightly declining as people migrate toward the larger communities (Grand Forks and Devils Lake) for employment.

4.13.8 Data Limitations and Other Key Documents

Geologic hazards, particularly landslide hazard areas, are commonly influenced by local factors and are difficult to analyze at the countywide level. Continued study by the North Dakota Geological Survey should aid in identifying those areas at greatest risk and potentially in need of mitigation action.

Other key documents related to the geologic hazards include:

- North Dakota Emergency Operations Plan

4.14 Windstorm

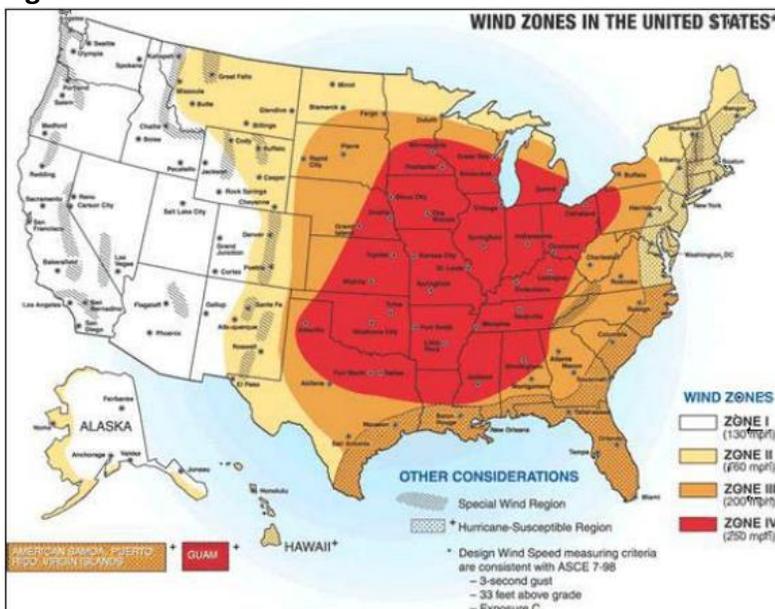
Frequency	Possible	1-10% probability in a given year
Impact	Minor	1%-10% of jurisdiction affected
Risk Class	2	Minor Hazard
Seasonal Pattern	None	
Duration	Hours/Days-unpredictable and dependent on specific event.	
Speed of Onset	Adequate warnings-National Weather Service does issue high wind watches and warnings.	

4.14.1 Description

Strong winds can occur year-round in North Dakota and therefore in Bottineau County. This section focuses on high wind events that occur separately from tornadoes and severe thunderstorms. These winds typically develop with strong pressure gradients and gusty frontal passages. The closer and stronger two systems are, (one high pressure, one low pressure) the stronger the pressure gradient, and therefore, the stronger the winds are. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase. Strong winds can be particularly dangerous to aviation.

FEMA recognizes four wind zones in the U.S., depicted in Figure 4.14.1A Bottineau County falls into Zone II. Winds speeds reach up to 160 miles per hour in Zone II. No special wind regions are identified in Bottineau County.

Figure 4.14.1A United States Wind Zones



Source: FEMA

4.14.2 Geographic Location

High winds can occur anytime and anyplace, including Bottineau County.

The Bismarck National Weather Service reports the strongest documented wind speed is 90mph reported at Landsford during a thunderstorm on July 11, 2004. The highest documented non thunderstorm wind was 75 mph occurring on January 15, 2014, after a strong early winter season storm moved through.

Some of the major high wind events in Bottineau County affected specific areas; they are described in table 4.14.2A.

Table 4.14.2A High Wind Events

Date	Description	Damage
October 31, 1999	An intense low pressure system over southern Saskatchewan Canada trailed a strong cold front into eastern Montana. The system brought widespread winds in excess of 65 mph to western and central North Dakota. The high winds combined with very dry conditions caused numerous wild fires burning thousands of acres of land and a few buildings.	Homes and businesses reported wind damage to roofs and windows.
July 20, 2001	Winds of 70 mph were reported in Willow City.	No damage reported.
June 29, 2002	Winds of 60 mph were reported 7 miles northwest of Maxbass. Bottineau reported winds of 70mph.	Two people were injured by flying debris at a campground near Bottineau
November 29, 2002	After record high temperatures, a strong Canadian cold front moved rapidly south through the state producing strong northwest winds of 40 to 70 mph over western and central North Dakota. The cold front brought much colder air and a few snow showers. Winds in Bottineau County were reported at 70mph.	No damage reported.
July 2, 2003	Hail was reported .75 inches in Lansford and wind of 59mph two miles northwest of Bottineau	Extensive crop damage.
March 10, 2004	A fast moving cold front brought strong to high winds to western and central North Dakota. Sustained winds of 40 mph with gust to 60 mph were common over western and central North Dakota	No damage reported.
July 11, 2004	A line of late night severe thunderstorms moved east out of Renville County through Bottineau causing widespread wind damage. Wind speed at Lake Metigoshe was reported at 78 mph.	Nearly 200 trees were blown over, three (3) barns were damaged, four (4) new 60,000 bushel grain storage buildings, valued at \$300,000 totally destroyed in western Bottineau County. On Lake Metigoshe, numerous boats, piers and trees were damaged, several cabins had structural damage.
December 11- 12,	A strong cold front brought high winds to western and central North Dakota. The frontal system also brought scattered snow	One minor injury and minor property damage region wide.

2004	showers with areas of blowing snow reducing visibilities caused by winds of 40 to 50 mph and gusts of 50 to 65 mph.	
March 9, and March 10, 2005	A strong cold front moved rapidly through the northern plains resulting in strong winds over western and central North Dakota. Sustained speeds were generally 30 to 40 mph.	Reduced visibilities restricted travel.
June 26, 2005	Severe thunderstorm with .88" hail 10 miles north of Bottineau and 1.0 inch hail in Newburg accompanied by 60 mph winds and 2.6 " of rain.	Lansford street flooding and county road flooding and crop damage.
August 13, 2005	Bottineau County reported wind at 68 mph.	Trees and tree branches were broken. Some trees fell onto electric power lines in Bottineau resulting in a power outage.
July 2, 2006	Winds of 60 mph were reported in Willow City.	No damage reported.
June 26, 2007	Winds of 68 mph were reported in Kramer.	No damage reported.
July 31, 2007	6 miles east northeast of Newburg winds reached 81 mph. The storms produced both hail and wind.	Major crop loss in the Newburg area. Farm buildings were damaged or destroyed. A diesel fuel storage tank had its valve broken resulting in a diesel fuel spill of 2,000 gallons.
August 11, 2007	60 mph winds reported in Bottineau from thunderstorm outflow boundary.	No damage reported.
November 13, 2007	40 mph winds in Bottineau County caused by a strong low pressure system and jet stream moving across the region creating a tight pressure gradient.	Down spouts were torn from a home in Bottineau.
March 24, 2008	A strong low pressure system and its associated cold front moved across the region giving Bottineau County winds of up to 64 mph.	No damage reported.
October 26, 2008	Strong high pressure building into the Northern Plains and low pressure pushing east into the Great Lakes produced a tight pressure gradient over west and central North Dakota, resulting in sustained winds of 40 to 45 mph and wind gusts as high as 65 mph in Bottineau County	No damage reported.
June 18, 2009	Thunderstorms caused 60 mph winds and heavy rainfall.	No wind damage but flooding did occur.
January 31, 2009	A low pressure system resulted in sustained winds of over 40 mph.	No damage reported.
January 5-6, 2010	Winds of 20 to 35 mph developed causing near blizzard conditions.	No travel advisories were issued.
January 25, 2010	Peak wind gusts of 45 to 65 mph developed causing blizzard conditions.	Road, school, and business closures.
May 25, 2010	Sustained winds of 40 mph with gusts of 60 mph.	Tree damage, power lines were downed, and scattered property damage.
May 29, 2010	Thunderstorm winds reached 70 mph.	Damage on the west side of Bottineau, several grain bins were knocked over, one transmission line was knocked down, tree damage occurred.

October 28, 2010	40 to 60 mph winds with peak wind gusts of 70 mph.	Blizzard conditions with scattered power outages, downed trees, school closures, traffic accidents, resulting in travel advisories.
February 13, 2011	Sustained winds of 40 mph with wind gusts to 60 mph.	None reported in Bottineau County.
February 17, 2011	Wind gusts of 45 mph with 4-5 inches of snow.	Blizzard conditions with road, school, and business closures.
March 11-12, 2011	Sustained winds in excess of 40 mph with gusts to around 70 mph.	Road, school, and business closures. ND National Guard was activated to perform motorist rescues.
March 22-23, 2011	Wind gusts of up to 45 mph	Blizzard conditions with road, school, and business closures.
April 30, 2011	40 to 60 mph sustained winds with gusts up to 70 mph,	Blizzard conditions with road, school, and business closures. Numerous reports of downed power lines. Governor issued a State Disaster Declaration.
May 31, 2011	40 mph sustained winds with gusts of 60 mph.	None reported.
June 25, 2011	85 mph thunderstorm winds were reported at Willow City.	Uprooted trees, and utility poles and a large barn were blown down.
October 17, 2011	40 mph sustained winds.	None reported.
June 9, 2012	65 mph thunderstorm winds.	Minor tree damage.
January 11, 2013	35 mph sustained winds	Blizzard conditions with road, school, and business closures.
January 19, 2013	Sustained winds of 40 mph with gusts of 60 mph.	Blizzard conditions with road, school, and business closures.
February 18, 2013	Four inches of snow combined with wind gusts of 40 mph.	Blizzard conditions with road, school, and business closures.
March 4, 2013	Wind gusts of 55 mph with heavy snow.	Blizzard conditions with road, school, and business closures.
June 21, 2013	60 mph thunderstorm winds.	None reported.
July 13, 2013	58-60 mph thunderstorm winds in the vicinity of Antler and Bottineau.	Tree damage.
August 30, 2013	60 mph thunderstorm winds in the vicinity of Bottineau.	Winds accompanied by large hail caused crop damage.
December 28, 2013	50 mph winds with new snow resulted in blizzard conditions.	Blizzard conditions with road, school, and business closures.
January 3, 2014	40 mph winds with light snow.	Blizzard conditions with road, school, and business closures.
January 4, 2014	30 mph winds causing -62 degree Fahrenheit wind chills.	None reported.
January 15, 2014	Wind gusts of 60 mph were common; peak wind gusts of 75 mph were reported.	Blizzard conditions with road, school, and business closures. Brief power outages occurred.

January 26, 2014	60 mph wind gusts.	Blizzard conditions with 0 visibilities causing numerous accidents.
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4.14.3 Previous Occurrences

The National Climatic Data Center reports there were no high wind events reported in Bottineau County other than those mentioned above. High winds in Bottineau County are usually associated with winter storms, tornadoes and thunderstorms. The highest concentrations of high wind events are in the western and central sections of North Dakota, with particular focus on the southwest corner of the state, not in Bottineau County. It is important to note that high wind events may occur across several counties at once. In Bottineau County, this would include the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City.

North Dakota has had only one major federal disaster declaration related to high winds, DR 1483, which did not include Bottineau County.

4.14.4 Probability and Magnitude

Based on location, Bottineau County can expect on average one high wind event, not related to tornadoes or thunderstorm winds, in any given year. The Federal Emergency Management Agency places Bottineau County in Zone II (160 mph) for structural wind design. (Federal Emergency Management Agency, 2004) As history demonstrates, these types of winds can remove roofs, move mobile homes, topple trees, take down utility lines, and destroy poorly-built or weak structures. Building codes can help reduce the likelihood or magnitude of structures failing due to high winds.

4.14.5 Risk Assessment

Vulnerability Overview

Table 4.14.5A through Table 4.14.5D show the damage indicators based on wind speed for various types of residential, farm, and business structures.

Table 4.14.5A One and Two Family Residences

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	53-80 mph (65 mph)
Loss of roof covering material (<20%), gutters, and/or awning; loss of vinyl or metal siding	63-97 mph (79 mph)
Broken glass in doors and windows	79-114 mph (96 mph)
Uplift of roof deck and loss of significant roof covering material (>20%); collapse of chimney; garage doors collapse inward; failure of porch or carport	81-116 mph (97 mph)
Entire house shifts off foundation	103-141 mph (121 mph)

Large sections of roof structure removed, most walls remain standing	104-142 mph (122 mph)
Top floor exterior walls collapsed	113-153 mph (132 mph)
Most interior walls of top story collapsed	128-173 mph (148 mph)
Most walls collapsed in bottom floor, except small interior rooms	127-178 mph (152 mph)
Total destruction of entire building	142-198 mph (170 mph)

Source: Storm Prediction Center, 2007.

Table 4.14.5B Single Wide Manufactured Homes

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

Source: Storm Prediction Center, 2007.

Table 4.14.5C Small Barns and Farm Outbuildings

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	53-78 mph (62 mph)
Loss of wood or metal roof panels	61-91 mph (74 mph)
Collapse of doors	68-102 mph (83 mph)
Major loss of roof panels	78-110 mph (90 mph)
Uplift or collapse of roof structure	77-114 mph (93 mph)
Collapse of walls	81-119 mph (97 mph)
Overturning or sliding of entire structure	83-118 mph (99 mph)
Total destruction of building	94-131 mph (112 mph)

Source: Storm Prediction Center, 2007.

Table 4.14.5D Small Retail Building

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	54-81 mph (65 mph)
Loss of roof covering (<20%)	65-98 mph (78 mph)
Broken glass in windows and doors	72-103 mph (86 mph)
Uplift of roof decking; significant loss of roof covering (>20%)	81-119 mph (98 mph)
Canopies or covered walkways destroyed	83-114 mph (98 mph)
Uplift or collapse of entire roof structure	101-140 mph (119 mph)
Collapse of exterior walls; closely spaced interior walls remain standing	120-159 mph (138 mph)
Total destruction of entire building	143-193 mph (167 mph)

Source: Storm Prediction Center, 2007.

Since structures are vulnerable to strong winds, those inside them are also at risk. The National Weather Service office in Bismarck warns for high winds events in the regional area. Meteorologists use a variety of tools such as Doppler radar and weather spotters to predict high wind events and issue warnings that are broadcast over NOAA Weather Radio and other media. Mobile homes, even if tied down and automobiles are not safe places to take shelter during high wind events. Bottineau County has approximately 125 mobile homes. Given approximately 2.06 people per household in Bottineau County, roughly 258 people are at enhanced risk from strong winds. Besides structure failure, wind-driven projectiles and shattered glass can injure or kill occupants. Note that potential wind speeds based on FEMA’s wind zones can exceed the estimates listed in the above tables.

Homes are built of various materials. Manufactured or mobile homes have the highest vulnerability to wind damage (Table 4.14.5F). Wood frame homes are the standard for Bottineau County as shown in table 4.14.5E. Many of these homes have been in place since settlement occurred and have stood the test of time. Tornado winds are about the only type of Bottineau County wind that damages these homes.

Table 14.14.5E Structural Build of Bottineau County Residents’ Home

	Wood Frame	Wood/Partial Brick	Steel	Other
Urban Residential Structures	99%	<1%	0%	<1%
Rural Residential Structures	99%	<1%	<1%	<1%
Rural Tax Exempt Structures	99%	<1%	<1%	<1%

Source: Estimates based on conversation with the Bottineau County Tax Equalization Director

Table 4.14.5F Estimated Manufactured Homes (not affixed to the ground) Count in Bottineau County

Location	Count
Urban Residential Structures	100
Rural Residential Structures	25

Source: Bottineau County Tax Equalization Director

Another consideration that must be taken into account concerning wind damage is vulnerable populations. Table 4.14.5G lists the vulnerable population locations in Bottineau County. High winds can damage the structures housing vulnerable populations requiring evacuation, relocation, and possible medical care for the vulnerable population.

Table 4.14.5G Vulnerable Populations

Facility Name	Type	Location	Population
St. Andrew’s Health Center	Hospital	Bottineau	25 Bed
St. Andrew’s Health Center Apartments	Living	Bottineau	14 Apartments
Good Samaritan Nursing Home	Living	Bottineau	65 Beds
Bottineau Public Schools (K-12)	School	Bottineau	651 Students
Westhope Public Schools (K-12)	School	Westhope	70 Students
Dakota College	College	Bottineau	169 On-Campus Students
Oak Manor	Living	Bottineau	30 Apartments
Janet Bechtold	Daycare	Bottineau	18 Children
Charlotte Bedlion	Daycare	Bottineau	18 Children
Heather Belcourt	Daycare	Bottineau	17 Children
Jodi Gustafson	Daycare	Bottineau	16 Children
Cindy Lagasse	Daycare	Bottineau	10 Children
Patty Monson	Daycare	Bottineau	18 Children
Louise Schneiderman	Daycare	Bottineau	9 Children
Rachael Stewart	Daycare	Bottineau	15 Children
Candace Trottier	Daycare	Westhope	12 Children
Samantha Werner	Daycare	Newburg	18 Children
Lupe Wuster	Daycare	Bottineau	15 Children
Ann Zorn	Daycare	Bottineau	18 Children
Building Blocks Learning Center	Center	Bottineau	65 Children
Sandra Anderson	Family Provider	Lansford	9 People
Lynette Dubois	Self-Declared	Bottineau	5 Children
Nancy Erickson	Self-Declared	Westhope	5 Children
Agnes Schumacker	Self-Declared	Westhope	5 Children

Note: Day care population shown is capacity.

Sources: Bottineau County Emergency Manager, ND Department of Public Instruction, and http://childcarecenter.us/north_dakota_homecare/bottineau_nd_county#.VSwVek10y70

The Bottineau County cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City have adequate shelters identified to shelter their populations should the need arise. The townships’ population is mainly farmers who are deemed to be self-sufficient should a high wind storm power outage occur. Most farmers have standby generators to provide electricity to their homes and farming operation during a high wind storm power outage.

Based on the history of summer storms over the past 63 years, Bottineau County has been rated relatively rated low.

To refine and assess the relative vulnerability of Bottineau County to windstorm events, ratings were assigned to pertinent factors that were examined at the county level. These factors include: social

vulnerability index, prior events, prior annualized property damage, building exposure valuation, population density, livestock exposure, crop exposure, and annualized crop loss. A rating value of 1-10 was assigned to the data obtained for each factor and then weighted equally and factored together to obtain overall vulnerability scores for each comparison and to determine the most vulnerable counties. The Social Vulnerability Index normally ranges from 1-5. To give the Social Vulnerability Index the same weight as the other factors, the numbers were multiplied by two. Overall vulnerability scores were sorted into rankings from low, low-moderate, moderate, moderate-high, and high. Table 4.14.5H summarizes the calculated ranges applied to determine the overall vulnerability ranking.

Table 4.14.5H Rankings for Overall Windstorm Vulnerability

Low	Low-Moderate	Moderate	Moderate-High	High
14-20	21-27	28-34	35-41	42-48

The following are the data sources for the rating factors: Social Vulnerability Index for Bottineau County from the Hazards and Vulnerability Research Institute at the University of South Carolina, National Climatic Data Center (NCDC) storm events (2000-2012), U.S. Census Bureau (2010), USDA’s Census of Agriculture (2007), and the USDA Risk Management Agency (2003-2012). Table 4.14.5I shows the vulnerability ranking for Bottineau County derived from the analysis of data from these sources. The overall vulnerability score is Low for Bottineau County, based on the rankings above.

Table 4.14.5I Bottineau County Windstorm Vulnerability Ranking

Social Vuln. Rating	# of Events (2000-2003)	Property Damages	Annual Property Damage	Total Building Expos. (\$000)	Pop. Density	Livestock Expos.	Crop Expos.	Crop Insurance Payments (2003-2012)	Crop Losses (2003-2012)	Annual Crop Losses	Vuln. Score
10	16	\$50,000	\$3,846	\$947,645	3.9	\$8,891,000	\$158,991,000	\$790,145	\$887,803	\$88,780	25

The overall vulnerability is shared equally between the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, and Willow City.

Loss Estimates

Based on NCDC event narratives, typical losses due to windstorms include crop loss, vehicle accidents, downed power lines and utility poles, power outages, damaged structures, and human fatalities or injuries, sometimes due to vehicle accidents. Between 2000 and 2013 there were no property damages reported by the National Climate Data Center for Bottineau County.

As mentioned previously, total crop insurance payments for insurable crops due to wind events in Bottineau County totaled \$177,852 between 2003 and 2012. According to the 2011 North Dakota Crop Insurance Profile Report issued by the USDA Risk Management Agency, 89 percent of North Dakota insurable crops were insured in 2011. Therefore, the crop insurance payments have been extrapolated to estimate losses to all insurable crops. Extrapolated crop losses due to windstorms in Bottineau County from 2003-2012 totaled \$199,834 or about \$19,983 annually. (Risk Management Agency, 2003-2012)

Bottineau County and the State of North Dakota have significant property in Bottineau County that is at risk to wind damage. The state has Lake Metigoshe State Park, the North Dakota Forest Service Headquarters, and Dakota College. The state has 43 properties, with \$4,829,185 in state agency assets and \$26,580,147 in State University Assets. Bottineau County and the cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope, Willow City have local government critical facilities valued at \$26,517,670.

4.14.6 Critical Facilities in Hazard Prone Areas

The Storm Prediction Center has developed damage indicators to be used with the Enhanced Fujita Scale for different types of buildings. While windstorms can occur separate from tornadoes, the damage they cause can be very similar. Building types that many state-owned buildings fall under are shown in Table 4.14.6A and Table 4.14.6B.

Table 4.14.6A Institutional Buildings

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	59-88 mph (72 mph)
Loss of roof covering (<20%)	72-109 mph (86 mph)
Damage to upper walls and roof, loss of rooftop HVAC equipment	75-111 mph (92 mph)
Broken glass in windows or doors	78-115 mph (95 mph)
Uplift of lightweight roof deck and insulation; significant loss of roof materials (>20%)	95-136 mph (114 mph)
Façade components torn from structure	97-140 mph (118 mph)
Damage to curtain walls or other wall cladding	110-152 mph (131 mph)
Uplift of pre-cast concrete roof slabs	119-163 mph (142 mph)
Uplift of metal deck with concrete fill slab	118-170 mph (146 mph)
Collapse of some top story exterior walls	127-172 mph (148 mph)
Significant damage to building envelope	178-268 mph (210 mph)

Source: Storm Prediction Center, 2007.

Table 4.14.6B Metal Building Systems

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	54-83 mph (67 mph)
Inward or outward collapsed of overhead doors	75-108 mph (89 mph)
Metal roof or wall panels pulled from the building	78-120 mph (95 mph)
Column anchorage failed	96-135 mph (117 mph)
Buckling of roof purlins	95-138 mph (118 mph)
Failure of X-braces in the lateral load resisting system	118-158 mph (138 mph)
Progressive collapse of rigid frames	120-168 mph (143 mph)
Total destruction of building	132-178 mph (155 mph)

Source: Storm Prediction Center, 2007.

Many of the critical and special needs facilities, although adequate for most events, may not be able to withstand 160-200 mph windstorms, as recommended by the Federal Emergency Management Agency. (Federal Emergency Management Agency, 2004) The structures could suffer broken windows and dented exteriors, or even collapse. Even if a structure performs well in the high winds, flying debris and falling trees may damage the building. Table 4.14.6C shows the damage indicators for a typical school building.

Table 4.14.6C School Building (Junior or Senior High School)

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

Source: Storm Prediction Center, 2007.

Above ground infrastructure, namely overhead power lines, communications towers and lines, and structures, are very susceptible to strong winds. High winds and falling trees can damage this type of infrastructure and disrupt services. Therefore, even an indirect hit by strong winds could disrupt regional electricity and possibly telephone services. Table 4.14.6D shows the Enhanced Fujita Scale Damage Indicators for electric transmission lines.

Table 4.14.6D Electrical Transmission Lines

Damage Description	Wind Speed Range (expected in parentheses)
Threshold of visible damage	70-98 mph (83 mph)
Broken wood cross member	80-114 mph (99 mph)
Wood poles leaning	85-130 mph (108 mph)
Broken wood poles	98-142 mph (118 mph)
Broken or bent steel or concrete poles	115-149 mph (138 mph)
Collapsed metal truss towers	116-165 mph (141 mph)

Source: Storm Prediction Center, 2007.

Should above ground facilities such as water treatment facilities or a sewer lagoon be damaged, water and sewer services could also be disrupted. Debris may also block roadways making transportation and commerce difficult if not impossible.

Table 4.14.6E Electrical Provider

	North Central Electric Cooperative	Ottertail Power Company
Antler		X
Bottineau		X
Gardena		X
Kramer		X
Landa		X
Lansford		X
Maxbass		X
Newburg		X
Overly	X	
Souris		X
Westhope		X
Willow City		X
Rural Bottineau County	X	

4.14.7 Development in Identified Hazard Areas

Future development could be impacted by windstorm hazards in those communities that lack building codes. Newer structures are generally built to withstand strong winds. Mobile homes, however, continue to be the exception. Those jurisdictions enforcing building codes in Bottineau County reduce the vulnerabilities of future development from windstorms through those codes. New and future development in those jurisdictions that have adopted and enforce the state building code should be better able to withstand extreme winter weather.

Increased populations add to the challenges of managing development in areas vulnerable to windstorms. The incident of the building under construction collapsing due to high winds shows that new development is at risk to windstorm events. Bottineau County again has had a stable or declining population. However, the public depends more and more on electronic appliances. These increases create a higher demand for electricity and essential services that can be knocked out in a power outage from a windstorm.

4.14.8 Data Limitations and Other Key Documents

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

Other key documents related to the Windstorm hazard include:

- North Dakota Emergency Operations Plan, Severe Storms Annex

4.15 Risk Assessment Summary

The risk assessment represents an approximate history and estimated vulnerabilities to Bottineau County and the incorporated jurisdictions from the hazards identified. As with any assessment involving natural or human caused hazards, all potential events may not be represented here and an actual incident may occur in a vastly different way than described. This assessment, however, will be used, where possible, to minimize damages from these events in the future.

Every type of event is different, ranging from population to property to economic impacts. Incidents also have different probabilities and magnitudes even within hazards. For example, a light snowstorm will be different than a blizzard and a moderate flood will be different from both of those. Some hazards have estimates of dollar losses and population impacts whereas others are more qualitatively assessed based on the information available during the risk assessment process.

The hazards are prioritized using the best possible information on risks and vulnerabilities to provide guidance when selecting mitigation strategies. Generally, an evaluation of a specific mitigation activity will capture the benefits of such actions, including considering the probability of the hazard occurring and the disaster losses to be mitigated.

In addition to input from the individual jurisdictions, the following factors were considered when prioritizing the hazards:

- Probability or Frequency of a “Disastrous” Event
- Magnitude or Severity of a “Disastrous” Event
- Impact to Critical Facilities
- Impact to Critical Infrastructure
- Impact to Structures
- Impact to the Population
- Impact to Economic, Ecologic, Historic, and Social Values
- Impact to Future Development

For more information on these determinations, see the individual hazard profiles.

Table 4.15A shows the hazard prioritizations for Bottineau County as a whole while the following tables are specific to the individual jurisdictions. A hazard ranking of 1-3 placed the hazard in the High Hazard ranking or Class A, a ranking of 4-5 placed the hazard in the Moderate-High Hazard ranking or a Class B, a ranking of 6-8 placed the hazard in the Moderate Hazard ranking or Class C, and a ranking of 9 and above placed the hazard in a low ranking or a Class D. The townships are included in the county ranking.

Table 4.15A Bottineau County Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15B City of Antler Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15C City of Bottineau Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15D City of Gardena Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15E City of Kramer Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15F City of Landa Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15G City of Landsford Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15H City of Maxbass Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15H City of Newburg Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure

	Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15H City of Overly Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15H City of Souris Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15H City of Westhope Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

Table 4.15H City of Willow City Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather Hazardous Material Release
Moderate-High Hazard Class B	Communicable Disease Shortage or Outage of Critical Materials or Infrastructure Windstorm Wildland Fire
Moderate Hazard Class C	Drought Homeland Security Incident Transportation Accident
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards Dam Failure

5. MITIGATION STRATEGY

Hazard mitigation, as defined by the Disaster Mitigation Act of 2000, is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Studies on hazard mitigation show that for each dollar spent on mitigation, society saves an average of four dollars in avoided future losses. (Multi-Hazard Mitigation Council, 2005) Mitigation can take many different forms from construction projects to public education.

Hazard mitigation measures, which can be used to eliminate or minimize the risk to life and property, fall into three categories. First, are those that keep the hazard away from life and property (e.g., dams or levees). Second, are those which keep life and property away from the hazard (e.g., land use practices). Third, are those that do not address the hazard at all, but rather reduce the impact of the hazard on victims (e.g., insurance and warning systems).

Hazard mitigation measures must be practical, cost-effective, and environmentally and politically acceptable. Actions taken to limit the vulnerability of society to hazards must not in themselves be more costly than the value of anticipated damages. If the cost of a flood control project exceeds the value of flooding damages that could be prevented, community warning, evacuation, and other operational procedures may be the only available means of limiting the adverse impacts of a hazard. Such plans and procedures are not generally considered mitigation actions because they do nothing to reduce or limit the actual vulnerability of a community to a hazard; however, they may generate some savings in property losses or protect the population. For some hazards, there are no economic means of avoiding the effects of future damages, especially when it is virtually impossible to predict with any certainty the location, frequency, or severity of a hazard.

The primary focus of hazard mitigation actions must be at the point at which capital investment decisions are made. Capital investments, whether for homes, roads, public utilities, pipelines, power plants, chemical plants/warehouses, or public works, determine to a large extent the nature and degree of hazard vulnerability of a community. Accordingly, mechanisms such as zoning ordinances, which can be used to restrict new development in other high hazard areas, or building codes, which can ensure that new buildings are built to withstand the damaging forces or impacts of the hazards, are often the most useful mitigation approaches. The National Flood Insurance Program, for example, requires communities to adopt ordinances that control development and substantial improvements in floodplains as a condition for making flood insurance available in the community.

Once capital facilities are in place, very few opportunities will occur over the useful life of those facilities to correct any errors that may have been made in terms of their location or quality of construction with respect to hazard vulnerability. One opportunity that occasionally presents itself, however, is the instant depreciation of structures and facilities that accompanies the occurrence of a disaster. To replace damaged facilities, new capital investment is required from such sources as insurance payments, governmental disaster assistance grants or loans, or other sources.

The development of a pre-disaster mitigation strategy allows Bottineau County and the incorporated jurisdictions to create a vision for preventing future disasters, establish a common set of mitigation goals, prioritize actions, and evaluate the success of such actions. The mitigation strategy is based on the results of the risk assessment and recommendations by local officials and other stakeholders, including the public. The goals are broad, visionary, forward-looking statements that outline in general terms what the county and jurisdictions would like to accomplish. Goals are usually not measurable or fully attainable but rather ideals to which the county and communities should strive for as they develop and implement mitigation projects. The objectives link the goals and actions and help organize the plan for efficient implementation and evaluation.

All losses cannot be entirely mitigated, however, some actions can be taken, as funding and opportunities arise, that may reduce the impacts of disasters, thus, saving lives and property. Some mitigation actions were carried over from the 2010 plan and new ones were added based on community input received. Others were eliminated because they are not considered mitigation, were deemed not cost-effective or feasible, or were completed. Those projects identified by specific jurisdictions are listed with the name of the jurisdiction in parentheses.

The framework of Bottineau County's mitigation strategy has the following parts: purpose, goals, and objectives, which are defined as follows:

- The Purpose is an overarching philosophical or value statement regarding the primary function of the mitigation strategy.
- The Goals are broad and outline the overall direction of the county. Goals are usually not measurable or fully attainable but rather ideals to which Bottineau County and jurisdictions should strive for as they develop and implement mitigation projects.
- The Objectives link the goals and actions and help organize the plan for efficient implementation and evaluation.

5.1 Mitigation Purpose, Goals, and Objectives

The following is the overall hazard mitigation strategy for Bottineau County that includes a purpose statement, five goals, and multiple objectives.

Purpose: Minimize the vulnerability of the life and health of people, property, environment, and economy of Bottineau County and its communities from the impacts of natural and technological hazards as well as adversarial threats.

2015 GOALS AND OBJECTIVES

Goal 1: Save Lives and Reduce Injuries.

Objective 1.1: Ensure the availability of Ambulance Services to all Bottineau County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Objective 1.2: Ensure the availability of Law Enforcement Services to all Bottineau County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Objective 1.3: Ensure the availability of Fire Department Services to all Bottineau County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Goal 2: Protect private and public property and the environment.

Objective 2.1: Ensure the availability of Fire Department Services to all Bottineau County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Objective 2.2: Improve the disaster resistance of new construction and improvements.

Objective 2.3: Protect critical infrastructure including water, electricity, natural gas, storm sewer, sanitary sewer, roads, hospital, and airport.

Objective 2.4: Protect the public and government property during critical infrastructure outages.

Objective 2.5: Improve drainage in populated areas.

Objective 2.6: Keep wildfires from entering populated areas.

Objective 2.7: Prevent wildland/rural fire ignitions.

Goal 3: Promote the use of mitigation measures that reduce the impacts of all hazards.

Objective 3.1: Increase early warning capabilities.

Objective 3.2: Improve data for analyzing hazards and vulnerabilities.

Goal 4: Protect the citizens of Bottineau County from natural and man-made hazards..

Objective 4.1: Increase hazard awareness and warning capabilities.

Objective 4.2: Provide safe shelters for the public and train public on shelter-in-place protocols.

Objective 4.3: Reduce drifting snow and hazardous visibilities along key roadways.

Objective 4.4: Provide all hazards education on personal protection.

Objective 4.5: Improve roads and bridges to reduce losses on flood-prone roadways.

Objective 4.6: Promote flood research and planning.

Goal 5: Increase public awareness of hazards through emergency services awareness and educational campaigns.

Objective 5.1: Raise awareness of personal mitigation activities through public education.

Objective 5.2: Encourage individuals to reduce the wildland/rural fire threat to private and public property.

5.2 Mitigation Actions

This section describes the intentions of Bottineau County to address county and local vulnerabilities identified in the risk and capability assessments through specific mitigation actions that contribute to an overall mitigation strategy. Mitigation actions are specific activities that provide the detail on how Bottineau County will accomplish identified objectives, and ultimately meet the mission and goals outlined in this plan. This section also reports on the status of previously identified mitigation actions as a measure of the progress that Bottineau County is making toward its mitigation goals.

5.2.1 Evaluating 2010 Mitigation Actions

The updated Plan must identify the ongoing, completed, deleted, or deferred actions or activities from the previously approved Plan. It must also include any new actions identified since the previous Plan. The mitigation actions take into consideration the vulnerability and capability assessment, and are intended to address areas of high vulnerability or where capabilities should be strengthened. The Planning Team

revisited the 2010 mitigation actions during the planning process in 2015. The Planning Team was provided a summary table of the actions and instructed to provide a detailed status report including information on if the action was ongoing, completed, deferred, or should be deleted. The Planning team members validated or revised the 2010 actions and then identified new mitigation actions for the plan.

A result of the action strategy update is a measure of progress towards meeting the Plan’s goals. Table 5.2.1A below identifies the Bottineau County mitigation objective title, action descriptions, and the 2015 status and status update. The 2010 Hazard Mitigation Plan did not list clear defined mitigation goals, therefore the ID number in Table 5.2.1A corresponds with the 2015 Hazard Mitigation goals and objectives. The status update notes demonstrate that many of these actions are being implemented and helping to reduce future losses.

Table 5.2.1A 2015 Status of Mitigation Actions from 2010 Plan

City or County	Project	Purpose	Cost / Funding Source	Category	Status / Timeframe	2015 Status (Completed, Deleted, Carry Over, or On-Going)
Bottineau County	Yearly inspection to keep drains free of weeds, trees and other debris	Excess amount of drainage at the Westhope Airport	Unknown / City Airport and County Drain Board	Flooding	On-going	On-going
Bottineau County	Public notice to the public to cut ditches in the fall. County and landowners cut county roads and clear culverts.	Ditches and culverts become plugged with excess debris due to lack of maintenance and excess runoff	Postage and letter generation / County Road Department	Flooding	On-going	On-going
Bottineau County	Inform the public of the potential for flooding. Due to geography, a flood situation only occurs along the Mouse River Watershed, Monitor moisture content. Conduct a campaign to keep the public informed about the flood potential. County officials leave this to individual communities and townships. County Road Dept. has repaired most of the roads that were damaged.	Prepare for potential flood and moisture content.	Staff time / Emergency Management	Flooding	On-going	On-going
Bottineau County	The Water Board is attempting to study	Great amounts of water meet at the confluence of	\$150,000 / Water Board and State	Flooding	On-going	On-going

	and implement a project for creek drainage.	creek drainage	Water Commission			
Bottineau County	Inform population of flood insurance program. Publications and assistance with NFIP from the State Water Commission.	Public Awareness of flood hazards.	No cost / county commission	Flooding	On-going	Deleted
Bottineau County	Inform public aware of impassible roads or closed roads during winter weather events.	Public awareness of winter storms.	Unknown / Law Enforcement	Winter Storms	On-going	On-going
Bottineau County	Inform public of winter and summer weather events through exercises, workshops, and literature	Public awareness of preparedness of winter and summer weather	Staff time / Emergency Management	Winter Storms, Summer Storms	On-going	On-going
Bottineau County	Inform the public of the importance of adopting plans and procedures for tornado drills.	Public awareness of tornado drill procedures.	Staff time / Emergency Management	Summer Storms	On-going	On-going
Bottineau County	Training for storm spotters network.	Improve countywide storm spotter network	No Cost / Emergency Management	Winter Storms, Summer Storms	On-going	On-going
Bottineau County	Encourage dealers to inform employees and customers of dangers and safety procedures that must be followed. Provide informational meetings and brochures.	Public awareness of hazard materials	Staff time / Emergency Management	Hazardous Materials and Communicable Disease	On-going	On-going
Bottineau County	Training of personnel in the safety procedures of chemical spills.	Hwy 83 through the county and agricultural concerns of hazardous materials events	Staff time / Emergency Management	Hazardous Materials and Communicable Disease	On-going	On-going
Bottineau County	Implement public Awareness campaigns utilize media and literature to inform the public of hazards of grass fires and how to prevent them.	Prevent grass fires.	Staff time/ Fire Departments	Rural and Urban fires.	On-going	On-going
Bottineau County	Radios and cell phones	Reduce problems with	Unknown / Fire	Winter Storms, Summer	On-going	Completed

	for road crews	blocked roads for emergency response vehicles	Departments	Storms, Flooding, Rural and Urban Fires, Hazardous Materials		
Bottineau County	Complacency of the people in the United States is a problem in urban fire public awareness. The measure must be implemented immediately and is to be continued indefinitely. Local officials must initiate and take the lead role in this measure in regard to public awareness.	Public awareness of urban fires throughout the county to prevent and reduce the event of a urban fire.	Staff time / Fire Departments	Urban Fires	On-going	On-going
Bottineau County	Widen roads with outlets for fire protection in the Turtle Mountain – lake Metigoshe area and also develop wide fire breaks; install additional hydrant system in lake area	Becoming more populated area need to have wider roads and outlets for fire protection	\$3 Mil / State Forestry Service and Bottineau County	Rural Fires	Estimated time of completion 2015	Carry Over
Bottineau County	Inform public of fire index and regulations regarding burning during high fire indexes. Place burn ban in drought areas.	Increased fire potential during time of drought.	Staff time/ Fire Departments	Rural and Urban Fires, Drought	On-going	On-going
Bottineau County	Inform public as to crucial water supplies and ban unnecessary use of water. Conserve water and locate foreign water supplies.	Possible water shortage during a drought event.	Staff time/ Emergency Management	Drought, Shortage of Critical Materials	On-going	On-going
Antler	Put up fence around water and sewer	Protect from tampering with water supply	\$15,000 / Antler City Council	Homeland Security Incident, Communicable Disease, Shortage of Critical Materials	Estimated time of completion 2011	On-going
Maxbass	Put up fence around water and sewer	Protect from tampering with water supply	15,000 / Maxbass City Council	Homeland Security Incident, Communicable Disease,	Estimated time of completion 2011	On-going

				Shortage of Critical Materials		
Newburg	Shelter for sewer pumps	Sewer pumps within Newburg are vulnerable to tampering	\$10,000 / Newburg City Council	Homeland Security Incident	Completed 2005	On-going
Willow City	Put up fence around water supply	Protect from tampering with water supply	\$15,000 / Willow City City Council	Homeland Security Incident, Communicable Disease, Shortage of Critical Materials	Estimated time of completion 2011	Completed
Westhope	Put up fence around water supply	Protect from tampering with water supply	\$15,000 / Westhope City Council	Homeland Security Incident, Communicable Disease, Shortage of Critical Materials	Estimated time of completion 2011	On-going
Bottineau	Put up fence around water supply	Protect from tampering with water supply	\$3,000 / Bottineau City Council	Homeland Security Incident, Communicable Disease, Shortage of Critical Materials	Completed 2005	On-going
Bottineau County	Training of emergency personnel. Provide training and exercises for personnel to deal with events	Emergency personnel needs adequate training for Transportation Accidents	\$50,000 / Emergency Management	Transportation Accidents	On-going	On-going
Bottineau County	Create evacuation and shelter plan for county	Organize transportation and locations to house citizens due to a disaster.	\$5,000 / Emergency Management	Dam Failure, Flooding, Winter Storms, Summer Storms, Communicable Disease, Hazardous Materials Incident, Transportation Accidents	Completed 2008	On-going
Antler	First Responder equipment for spill containment of high pressure oil pipelines and oil tankers	Increase safety of first responders when handling Hazardous Materials Incident	\$8,000 / Antler City Council	Hazardous Materials Incident	Estimated time of completion 2015	On-going
Antler	Demolish old abandoned buildings in Antler	Remove Hazardous buildings in city where animals and children can	\$12,000 / Antler City Council	Hazardous Materials Incident, Communicable Disease	Estimated time of completion 2015	On-going

		play.				
Bottineau (North end of City)	Move anhydrous ammonia and propane bulk plants out of town a safe distance to the southeast along the railroad tracks	Current location is a safety hazard to the high school (2 blocks away), the college (3 blocks away), the downtown business district and residential housing (1 block away)	\$250,000 / Bottineau City Council	Homeland Security Incident, Transportation Accident, Communicable Disease, Urban Fires	Estimated time of completion 2015	On-going
Bottineau	Install five additional early warning siren around the city	Current siren cannot be heard all over city. Project would allow everyone in Bottineau to clearly hear emergency warnings and seek shelter in a timely manner	\$75,000 / Bottineau City Council	Winter Storms, Summer Storms	Estimated time of completion 2012	On-going
Bottineau County	Conduct an Emergency Preparedness Campaign for citizens to recognize what to do in response to different emergencies. Could consist of distribution of flyer, radio and newspaper ads, and public meetings. Publish emergency phone numbers with instructions of how and when to use them.	Increase public knowledge of emergency response plans enhancing the safety of the community.	Staff time / Emergency Management	All Hazards	Estimated time of completion 2011	On-going
Bottineau	Purchase equipment for shelters in the county (churches and schools) shore power connections for generators for loss of power	Enhance shelter capabilities during emergencies	\$50,000 / Bottineau City Council and Emergency Management	Winter Storms, Summer Storms, Hazardous Materials, Transportation Accidents, Flooding, Dam Failure	Estimated time of completion 2012	On-going
Bottineau (North of City)	Install shore power connections for generator hook up at city well heads	Provide connections for generator due to power outage for water supply	\$40,000 / Bottineau City Council	Winter Storms, Summer Storms, Flooding	Estimated time of completion 2012	On-going
Bottineau County	Purchase 4 – 30kw / 3 phase emergency generators to use within city and county	This would provide the cities and county the ability to provide	\$160,000 / Bottineau County and Bottineau City Council	Winter Storms, Summer Storms, Flooding, Dam Failure	Estimated time of completion 2012	On-going

	during power outage	emergency power to critical infrastructure equipment and shelters during a prolonged power outage				
Bottineau (Oak Creek through city)	Clean debris from Oak Creek and install rip-rap	Allow better flow through the channel, preventing flooding and preventing erosion of creek banks.	\$650,000 / Bottineau City Council and Bottineau County	Flooding	Estimated time of completion 2013	Completed
Bottineau (School)	Purchase a 125kw/ 3 phase emergency generator to power the school during extended power outage.	Provide the school with shelter capabilities for the community	\$200,000 / Bottineau School, Bottineau City Council	Winter Storms, Summer Storms	Estimated time of completion 2011	On-going
Bottineau (School)	Increase the closed circuit security camera system in school by adding 20 cameras, with 4 of them outdoors.	Enhance the security system for the school provide a safer environment	\$20,000 / Bottineau School and Bottineau City Council	Homeland Security Incident	Estimated time of completion 2011	Completed
Bottineau (St. Andrews Healthcare)	Clean out drainage ditches at the north and west sides of town for storm water runs out of town instead of flooding town	Minimize street flooding in town near medical facilities	\$10,000 / Bottineau City Council and St. Andrew's	Flooding	Estimated time of completion 2011	Not Completed
Bottineau County	Establish gauging stations on Oak Creek, Boundary Creek, Willow Creek, Stone Creek, and Cutbank Creek	Allow monitoring of runoff water in tributaries of the Souris River so local water boards can coordinate releasing of water in the Clark Saylor wildlife refuge. This would help reduce the impact tailwaters have on buildings and agricultural lands adjacent to the Souris River.	\$200,000 / Water Board, Bottineau County, State Water Commission	Flooding	Estimated time of completion 2012	On-going
Bottineau County	Construct detention ponds on Oak Creek mainly in the Turtle	Detention ponds will temporarily detain water and keep runoff to	\$2,000,000 / Water Board, Bottineau	Flooding	Estimated time of completion 2012	On-going

	Mountain area	the desired rate, reduce flooding in southern Bottineau County. Allow waters to flow through Oak Creek over a longer period of time benefiting wildlife and reduce erosion.	County, State Water Commission			
Bottineau County	Purchase 4 gas air quality monitors for rural fire departments responding to fires at oil and hazardous materials storage facilities also conduct training with equipment	Detect hazardous or explosive conditions in the area of the fires to protect responders	\$15,000 / Fire Departments	Urban and Rural Fires	Estimated time of completion 2012	Completed
Kramer (Fire Hall)	Purchase 30kw / 208 volt / 3 phase generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Kramer City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Kramer (Sanitary Lift Station – 4th Ave. East)	Install shore power connection for generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Kramer City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Kramer (East side Hwy 14 between 2nd and 3rd)	Install new drain ditch and culverts to alleviate flooding on north end and east of city	Improve the flow of storm and flood water out of town to minimize flooding of buildings in town	\$50,000 / Kramer City Council	Winter Storms, Summer Storms, Flooding	Estimated time of completion 2013	Completed
Newburg	Purchase 30kw / 208 volt / 3 phase generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Newburg City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	Completed
Newburg	Install shore power connection for generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Newburg City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	Completed
Bottineau County (Lake Metigoshe area)	Install public warning system for this recreational area.	Provide early warning for impending severe weather or incident to people in the area	\$50,000 / Bottineau County	Winter Storms, Summer Storms	Estimated time of completion 2015	Completed
Bottineau County (Lake Metigoshe area)	Perform environmental hazard	Identify unsafe buildings and hazardous materials	\$10,000 / Bottineau County	Hazardous Materials Incidents, Communicable	Estimated time of completion 2015	On-going

	and safety assessment			Disease		
Landa (North of Town)	Install new culverts and clean out storm drainage	Improve drainage capacity will minimize storm runoff and flooding in town	\$10,381 / Landa City Council	Winter Storms, Summer Storms, Flooding	Estimated time of completion 2015	On-going
Lansford (Sanitary Lift Station and city water well)	Install shore power connection for generator	Provide power to sanitary sewer lift station during power outage.	\$8,000 / Lansford City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Lansford	Purchase 30kw / 208 volt / 3 phase generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Lansford City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Lansford (drain ditch south side of town)	Clean debris and vegetation from 300 yards of drain ditch on south side of town	Improve the flow of storm water runoff and flooding	\$10,000/ Lansford City Council	Winter Storms, Summer Storms, Flooding	Estimated time of completion 2013	On-going
Lansford (drain ditch east side of town)	Clean debris and vegetation from ¼ mile of drain ditch on east side of town	Improve the flow of storm water runoff and flooding	\$20,000/ Lansford City Council	Winter Storms, Summer Storms, Flooding	Estimated time of completion 2013	On-going
Maxbass (Fire Department)	Update equipment: ground fire trucks, water tankers, turnout gear	Enhance capabilities of rural fire departments in response to grass fires	\$800,000 / AFG and Fire departments	Urban and Rural Fires	Estimated time of completion 2013	Completed
Maxbass (Sanitary Lift Station on Martin Street)	Install shore power connection for generator	Provide power to sanitary sewer lift station during power outage.	\$3,500 / Maxbass City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Maxbass	Removal of dead trees	Reduce the risk of fire or power outage due to trees falling on power lines	\$6,000 / Maxbass City Council	Winter Storms, Summer Storms	Estimated time of completion 2011	On-going
Newburg (Cenex Anhydrous Bulk Tank)	Relocate anhydrous ammonia bulk plant away from city	Plant is near residential area and high school poses safety and health hazard	\$250,000 / Newburg City Council	Hazardous Materials Incident, Communicable Disease, Homeland Security	Estimated time of completion 2015	On-going
Overly	Destruction or relocation of old buildings in city	Provide safe environment for residents and children	\$10,000 / Overly City Council	Hazardous Materials, Communicable Disease	Estimated time of completion 2011	On-going
Overly (City Dump Ground)	Install security fence around dump	Prevent unauthorized dumping of hazardous materials	\$20,000 / Overly City Council	Hazardous Materials Incident, Communicable Disease	Estimated time of completion 2011	On-going

Souris (2 miles east of Souris on south side of hwy)	Rip-rap around inside of four earthen containment walls of city sewage lagoon.	Prevent erosion of containment walls that could contaminate water	\$50,000 / Souris City Council	Hazardous Materials, Communicable Disease	Estimated time of completion 2011	On-going
Souris (Corner of 1st Ave and West St.)	Construct a new bulk water fill station connected to city water main with pump and fill hose	Stop the current practice of bulk water filling taking place in the fire department. Prevent heavy trucks from tearing up city streets and security issues with leaving fire station unlocked	\$30,000 / Souris City Council, Fire Departments	Homeland Security Incident, Urban and Rural Fires	Estimated time of completion 2012	On-going
Souris (on 1st Ave between Main St. and Minnesota St.)	Install concrete re-enforcement to footings on west side ladders of the water tower	Stabilize water tower to prevent it from falling over and destroying the fire hall, nearby homes and businesses.	\$1,500 / Souris City Council	Shortage of Critical Materials	Estimated time of completion 2011	On-going
Souris (Fire Hall)	Purchase a 4" gas powered emergency water pump for flood response	Provide resources needed to quickly remove standing waters from the town reducing the flood water infiltration in homes and businesses	\$10,000 / Souris City Council	Flooding	Estimated time of completion 2011	On-going
Willow City (old abandoned school house)	Remove stagnant water from basement of old school house	Stagnant water is a source of growing bacteria, mold, and harboring rats. Reduce health hazards for community	\$2,000 / Bottineau County and First District Health Unit	Communicable Disease	Estimated time of completion 2011	On-going
Willow City (Fire Hall)	Install warning siren in city	Allow all residents to hear early warning siren	\$25,000 / Willow City Council and Fire Department	Winter Storms, Summer Storms	Estimated time of completion 2011	On-going
Willow City (Corner of Prairie St. and Oak St.)	Modify building into adequate shelter	Provide shelter for residents in case of disaster	\$20,000 / Willow City Council	Winter Storms, Summer Storms, Flooding, Transportation Accidents, Hazardous Materials, Shortage of Critical Materials,	Estimated time of completion 2011	On-going

				Communicable Disease		
Willow City (Corner of 3rd St. and Bottineau St.)	Install security door on the ladder on the water tower	Prevent unauthorized tampering of water tower	\$500 / Willow City City Council	Homeland Security, Communicable Disease	Estimated time of completion 2011	On-going
Willow City – Lift Station (Corner of hwy 60 and Bottineau St.)	Install shore power connection for generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Willow City City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Willow City – West Lift Station (Prairie St.)	Install shore power connection for generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Willow City City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Willow City	Purchase 30kw / 208 volt / 3 phase generator	Provide power to sanitary sewer lift station during power outage.	\$4,000 / Willow City City Council	Winter Storms, Summer Storms, Communicable Disease	Estimated time of completion 2013	On-going
Willow City	Replace sanitary sewer lift west of town	Prevent sewer backup in homes due to lift station failure	\$100,000 / Willow City City Council	Winter Storms, Summer Storms, Flooding	Estimated time of completion 2011	On-going
Willow City	Relocate anhydrous ammonia bulk plant	Prevent from Hazardous Materials incident from occurring	\$250,000 / Willow City City Council	Hazardous Materials Incident, Homeland Security Incident	Estimated time of completion 2015	On-going
Bottineau County (NW of Willow City)	Repair Willow Creek bank NW of Willow City.	Blown out hole needs to be filled in to prevent down stream flooding	\$10,000 / Bottineau County Emergency Management and Willow City City Council	Flooding	Estimated time of completion 2015	Completed
Bottineau County (NW of Willow City)	Buildup 4 spots on township roads	Roads are easily flooded and cause down stream flooding	\$50,000 / Bottineau County Emergency Management and Willow City City Council	Flooding	Estimated time of completion 2011	Completed
Gardena	Identify and remove old buildings along city limits which are a fire hazard	Reduce hazard for fires by removing fuels	\$10,000 / City of Gardena	Rural Fires, Urban Fires, Wildfires	Estimated completion 2015	On-going

5.2.2 2015 Mitigation Actions

A number of new actions and revisions to ongoing actions were identified during the 2015 planning process and are identified in the Table 5.2.2A below with the action description, hazard mitigated, the goal & objective ID, affected jurisdictions, the lead agency, the coordinating agencies, potential funding sources, cost and implementation timeframe. The actions were given an Action ID # for tracking purposes and are listed in order of the primary goal and objective they are designed to help achieve. The related goal and objective are also indicative of how each action contributes to the overall mitigation strategy. The Implementation Timeframe column indicates that many of the recommended mitigation actions can be implemented in the short term while others must be viewed as long-term measure. Although some of these projects may not be eligible for FEMA funding, counties may secure alternate funding sources to implement these projects in the future.

This list is designed to give the county a tool in project management and coordination. During the risk analysis phase of the multi-hazard mitigation plan, the emergency manager has the lead in coordinating with all appropriate agencies to facilitate the planning process; however, once a hazard has been identified for mitigation, the emergency manager steps back from the leadership role and will assume the role of team participant. The lead role in project development shifts to the county department or city responsible for project management, such as the Road department. Bottineau County and city officials have been through 40 disaster declarations in the past ten years. Through the response and recovery process they have become experts in determining the potential impact of many of the categories involved. Support was given by the North Dakota Department of Emergency Services, as well as consulting with neighboring counties to determine the most appropriate course of action.

TABLE 5.2.2A 2015 Mitigation Actions

ID #	Jurisdiction	Project	Hazard Mitigated	Lead Agency	Coordinating Agencies and Partners	Cost / Funding Source	Timeframe	Integration into Planning Mechanisms
1	Bottineau County	Yearly inspection to keep drains free of weeds, trees and other debris	Flooding Excess amount of drainage at the Westhope Airport	Bottineau County Water Board	Bottineau County Road Department, National Resource Conservation Service	Unknown / City Airport and County Drain Board	On-going	Capital improvement plans; requires approval by county commission
2	Bottineau County	Public notice to the public to cut ditches in the fall. County and landowners cut county roads and clear culverts.	Flooding Ditches and culverts become plugged with excess debris due to lack of maintenance and excess runoff	Bottineau County Weed Control Officer	Bottineau County Road Department, Bottineau County Water Board	Postage and letter generation / County Road Department	On-going	Capital improvement plans; requires approval by county commission
3	Bottineau County	Inform the public of the potential for	Flooding Prepare for potential flood and moisture	Bottineau County Emergency Manager	Bottineau County Water Board, State Water	Staff time / Emergency Management	On-going	County Emergency Management, social media

		flooding. Due to geography, a flood situation only occurs along the Mouse River Watershed, Monitor moisture content. Conduct a campaign to keep the public informed about the flood potential. County officials leave this to individual communities and townships. Bottineau County Road Dept. has repaired most of the roads that were damaged.	content.		Commission, Bottineau County Road Department			and websites; requires approval by county commission
4	Bottineau County	The Water Board is attempting to study and implement a project for creek drainage.	Flooding Great amounts of water meet at the confluence of creek drainage	Bottineau County Water Board	Bottineau County Road Department, City of Bottineau	\$150,000 / Water Board and State Water Commission	On-going	Public works and capital improvement plans, requires approval by county commission
5	Bottineau County	Inform public aware of impassible roads or closed roads during winter weather events.	Winter Storms Public awareness of winter storms.	Bottineau County Road Department	Bottineau County Emergency Manager, Emergency Services	Unknown / Law Enforcement	On-going	County Emergency Management, social media and websites; requires approval by county commission
6	Bottineau County	Inform public of winter and summer weather events through exercises, workshops, and literature	Severe Winter Storms and Summer Storms Public awareness of preparedness of winter and summer weather	Bottineau County Emergency Manager	Bottineau County Public Information Officer (IO)	Staff time / Emergency Management	On-going	County Emergency Management, social media and websites; requires approval by county commission
7	Bottineau County	Inform the public of the importance of	Severe Summer Storms Public awareness of	Bottineau County Emergency Manager	National Weather Service	Staff time / Emergency Management	On-going	County Emergency Management, social media

		adopting plans and procedures for tornado drills.	tornado drill procedures.					and websites; requires approval by county commission
8	Bottineau County	Training for storm spotters network.	Severe Winter Storms and Summer Storms Improve countywide storm spotter network	Bottineau County Emergency Manager	National Weather Service	No Cost / Emergency Management	On-going	Public-private partnership; requires approval by county commission
9	Bottineau County	Encourage hazardous material dealers to inform employees and customers of dangers and safety procedures that must be followed. Provide informational meetings and brochures.	Hazardous Materials Public awareness of hazard materials	Bottineau County Emergency Manager	Private industry (farm chemical supplies and oil companies)	Staff time / Emergency Management	On-going	Public-private partnership; requires approval by county commission
10	Bottineau County	Training of personnel in the safety procedures of chemical spills.	Hazardous Materials, Hwy 83 through the county and agricultural concerns of hazardous materials events	Bottineau County Emergency Manager	Antler Fire Dept., Mohall Fire Dept., Lansford Fire Dept., Glenburn Fire Dept., Maxbass Fire Dept., Westhope Fire Dept., Newburg Fire Dept., Souris Fire Dept., Kramer Fire Dept. Bottineau Fire Dept., Willow City Fire Dept.	Staff time / Emergency Management	On-going	Public-private partnership; requires approval by county commission
11	Bottineau County	Implement public awareness campaigns utilize media and literature to inform the public of hazards of grass fires and how to prevent them.	Wildland Fires Prevent grass fires.	Bottineau County Emergency Manager	Antler Fire Dept., Mohall Fire Dept., Lansford Fire Dept., Glenburn Fire Dept., Maxbass Fire Dept., Westhope Fire Dept., Newburg Fire Dept., Souris Fire Dept., Kramer Fire Dept. Bottineau	Staff time/ Fire Departments	On-going	County Emergency Management, social media and websites; requires approval by county commission

					Fire Dept., Willow City Fire Dept.			
12	Bottineau County	Complacency of the people in the United States is a problem in urban fire public awareness. The measure must be implemented immediately and is to be continued indefinitely. Local officials must initiate and take the lead role in this measure in regard to public awareness.	Urban Fires Public awareness of urban fires throughout the county to prevent and reduce the event of a urban fire.	Bottineau County Emergency Manager	Antler Fire Dept., Mohall Fire Dept., Lansford Fire Dept., Glenburn Fire Dept., Maxbass Fire Dept., Westhope Fire Dept., Newburg Fire Dept., Souris Fire Dept., Kramer Fire Dept. Bottineau Fire Dept., Willow City Fire Dept.	Staff time / Fire Departments	On-going	County Emergency Management, social media and websites; requires approval by county commission
13	Bottineau County	Widen roads with outlets for fire protection in the Turtle Mountain – Lake Metigoshe area and also develop wide fire breaks; install additional hydrant system in lake area	Wildland Fires Becoming more populated area need to have wider roads and outlets for fire protection	Bottineau County Emergency Manager	Bottineau County Road Dept., N.D. Forest Service, Lake Metigoshe Recreational District, Antler Fire Dept., Mohall Fire Dept., Lansford Fire Dept., Glenburn Fire Dept., Maxbass Fire Dept., Westhope Fire Dept., Newburg Fire Dept., Souris Fire Dept., Kramer Fire Dept. Bottineau Fire Dept., Willow City Fire Dept.	\$3 Mil / State Forestry Service and Bottineau County	Estimated time of completion 2020	Capital improvement plans; requires approval by county commission
14	Bottineau County	Inform public of fire index and regulations regarding burning during high fire indexes. Place burn ban in drought areas.	Wildland Fires Increased fire potential during time of drought.	Bottineau County Emergency Manager, Bottineau County Commission	Antler Fire Dept., Mohall Fire Dept., Lansford Fire Dept., Glenburn Fire Dept., Maxbass Fire Dept., Westhope Fire Dept., Newburg Fire Dept., Souris	Staff time/ Fire Departments	On-going	County Emergency Management, social media and websites; requires approval by county commission

					Fire Dept., Kramer Fire Dept. Bottineau Fire Dept., Willow City Fire Dept.			
15	Bottineau County	Inform public as to crucial water supplies and ban unnecessary use of water. Conserve water and locate alternative water supplies.	Drought, Shortage of Critical Materials Possible water shortage during a drought event.	Bottineau County Emergency Manager	Bottineau County Commission, Turtle Mountain Water District, Upper Souris Water District	Staff time/ Emergency Management	On-going	County Emergency Management, social media and websites; requires approval by county commission
16	Antler	Put up fence around water and sewer	Homeland Security, Communicable Disease Protect from tampering with water supply	Antler City Council	Antler Public Works	\$15,000 / Antler City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
17	Maxbass	Put up fence around water and sewer	Homeland Security, Communicable Disease Put up fence around water and sewer	Maxbass City Council	Maxbass Public Works	Homeland Security, Communicable Disease Protect from tampering with water supply	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
18	Westhope	Put up fence around water supply	Homeland Security, Communicable Disease Protect from tampering with water supply	Westhope City Council	Westhope Public Works	\$15,000 / Westhope City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
19	Bottineau County	Training of emergency personnel. Provide training and exercises for personnel to deal with events	Transportation Accidents Emergency personnel needs adequate training for Transportation Accidents	Bottineau County Emergency Manager	Bottineau County Sheriff's Office, Ambulance, Antler Fire Dept., Mohall Fire Dept., Lansford Fire Dept., Glenburn Fire Dept., Maxbass Fire Dept., Westhope Fire Dept., Newburg Fire Dept., Souris Fire Dept., Kramer Fire Dept. Bottineau Fire Dept., Willow City	\$50,000 / Emergency Management	On-going	Public- private partnership; requires approval by county commission

					Fire Dept.			
20	Antler	First Responder equipment for spill containment of high pressure oil pipelines and oil tankers	Hazardous Materials Increase safety of first responders when handling Hazardous Materials Incident	Bottineau County Emergency Manager	Antler Fire Dept., Souris Basin Planning Council	\$8,000 / Antler City Council	Estimated time of completion 2018	Capital improvement plans, requires approval by city council
21	Antler	Demolish old abandoned buildings in Antler	Hazardous Materials Incident, Communicable Disease Remove Hazardous buildings in city where animals and children can play.	Antler City Council	Antler Public Works	\$12,000 / Antler City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
22	Bottineau (North end of City)	Move anhydrous ammonia and propane bulk plants out of town a safe distance to the southeast along the railroad tracks	Homeland Security Incident, Transportation Accident, Current location is a safety hazard to the high school (2 blocks away), the college (3 blocks away), the downtown business district and residential housing (1 block away)	Bottineau County Emergency Manager	Bottineau City Council, Bottineau County LEPC, private industry (CHS)	\$250,000 / Bottineau City Council	Estimated time of completion 2020	Capital improvement plans, planning and zoning, ordinances, requires approval by city council
23	Bottineau	Install five additional early warning siren around the city	Severe Winter Storms and Summer Storms Current siren cannot be heard all over city. Project would allow everyone in Bottineau to clearly hear emergency warnings and seek shelter in a timely manner	Bottineau County Emergency Manager	Bottineau City Council	\$75,000 / Bottineau City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
24	Bottineau County	Conduct an Emergency Preparedness Campaign for citizens to	All Hazards Increase public knowledge of emergency response plans enhancing the	Bottineau County Emergency Manager	Bottineau County Commission, Bottineau County Public Information	Staff time / Emergency Management	On-going	County Emergency Management, social media and websites; requires

		recognize what to do in response to different emergencies. Could consist of distribution of flyer, radio and newspaper ads, and public meetings. Publish emergency phone numbers with instructions of how and when to use them.	safety of the community.		Officer			approval by county commission
25	Bottineau	Purchase equipment for shelters in the county (churches and schools) shore power connections for generators for loss of power	Severe Winter Storms and Summer Storms, Hazardous Materials, Transportation Accidents, Flooding, Dam Failure Enhance shelter capabilities during emergencies	Bottineau County Emergency Manager	Bottineau City Council	\$50,000 / Bottineau City Council and Emergency Management	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
26	Bottineau (North of City)	Install shore power connections for generator hook up at city well heads	Winter Storms, Summer Storms, Flooding Provide connections for generator due to power outage for water supply	Bottineau County Emergency Manager	Bottineau City Council	\$40,000 / Bottineau City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
27	Bottineau County	Purchase 4 – 30kw / 3 phase emergency generators to use within city and county during power outage	Severe Winter Storms and Summer Storms, Flooding, Dam Failure This would provide the cities and county the ability to provide emergency power to critical infrastructure equipment and shelters during a prolonged power outage	Bottineau County Emergency Manager	Bottineau City Council	\$160,000 / Bottineau County and Bottineau City Council	Estimated time of completion 2017	Capital improvement plans; requires approval by county commission

28	Bottineau (School)	Purchase a 125kw/ 3 phase emergency generator to power the school during extended power outage.	Severe Winter Storms and Summer Storms, Flooding, Dam Failure Provide the school with shelter capabilities for the community	Bottineau County Emergency Manager	Bottineau School Board, Superintendent of public schools	\$200,000 / Bottineau School, Bottineau City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by school board
29	Bottineau (St. Andrews Healthcare)	Clean out drainage ditches at the north and west sides of town for storm water runs out of town instead of flooding town	Flooding Minimize street flooding in town near medical facilities	Bottineau County Emergency Manager, Bottineau County Water Board, St. Andrews Healthcare Administrator	Bottineau County Commission, Bottineau City Council, Bottineau County Road Dept., State Water Commission	\$10,000 / Bottineau City Council and St. Andrew's	Estimated time of completion 2018	Capital improvement plans, requires approval by city council
30	Bottineau County	Establish gauging stations on Oak Creek, Boundary Creek, Willow Creek, Stone Creek, and Cutbank Creek	Flooding Allow monitoring of runoff water in tributaries of the Souris River so local water boards can coordinate releasing of water in the Clark Saylor wildlife refuge. This would help reduce the impact tailwaters have on buildings and agricultural lands adjacent to the Souris River.	Bottineau County Water Board	Bottineau County Emergency Manager, Bottineau County Commission, National Weather Service, N.D. Geological Survey, State Water Commission	\$200,000 / Water Board, Bottineau County, State Water Commission	Estimated time of completion 2020	Capital improvement plans; requires approval by county commission
31	Bottineau County	Construct detention ponds on Oak Creek mainly in the Turtle Mountain area	Flooding Detention ponds will temporarily detain water and keep runoff to the desired rate, reduce flooding in southern Bottineau County. Allow waters to flow through Oak Creek over a longer period of time benefiting wildlife and	Bottineau County Water Board	Bottineau County Emergency Manager, Bottineau County Commission, N.D. Geological Survey, State Water Commission	\$2,000,000 / Water Board, Bottineau County, State Water Commission	Estimated time of completion 2022	Capital improvement plans; requires approval by county commission

			reduce erosion.					
32	Kramer (Fire Hall)	Purchase 30kw / 208 volt / 3 phase generator	Severe Winter Storms and Summer Storms Provide power to sanitary sewer lift station during power outage.	Kramer City Council	Bottineau County Emergency Manager	\$4,000 / Kramer City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
33	Kramer (Sanitary Lift Station – 4th Ave. East)	Install shore power connection for generator	Severe Winter Storms and Summer Storms Provide power to sanitary sewer lift station during power outage.	Kramer City Council	Bottineau County Emergency Manager	\$4,000 / Kramer City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
34	Bottineau County (Lake Metigoshe area)	Perform environmental hazard and safety assessment	Hazardous Materials Incidents, Communicable Disease Identify unsafe buildings and hazardous materials	City of Bottineau Rural Fire Dept.	Bottineau County Emergency Manager, Lake Metigoshe Recreation District	\$10,000 / Bottineau County	Estimated time of completion 2017	Capital improvement plans; requires approval by county commission
35	Landa (North of Town)	Install new culverts and clean out storm drainage	Severe Winter Storms and Summer Storms, Flooding Improve drainage capacity will minimize storm runoff and flooding in town	Bottineau County Water Board, Bottineau County Road Dept.	Landa City Council, Bottineau County Emergency Manager	\$10,381 / Landa City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
36	Lansford (Sanitary Lift Station and city water well)	Install shore power connection for generator	Severe Winter Storms and Summer Storms, Flooding Provide power to sanitary sewer lift station during power outage.	Lansford City Council	Bottineau County Emergency Manager	\$8,000 / Lansford City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
37	Lansford	Purchase 30kw / 208 volt / 3 phase generator	Severe Winter Storms and Summer Storms, Flooding Provide power to sanitary sewer lift station during power outage.	Lansford City Council	Bottineau County Emergency Manager	\$4,000 / Lansford City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council

38	Lansford (drain ditch south side of town)	Clean debris and vegetation from 300 yards of drain ditch on south side of town	Severe Winter Storms and Summer Storms, Flooding Improve the flow of storm water runoff and flooding	Lansford City Council	Bottineau County Emergency Manager, Bottineau County Water Board, Bottineau County Road Dept.	\$10,000/ Lansford City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
39	Lansford (drain ditch east side of town)	Clean debris and vegetation from ¼ mile of drain ditch on east side of town	Severe Winter Storms and Summer Storms, Flooding Improve the flow of storm water runoff and flooding	Lansford City Council	Bottineau County Emergency Manager, Bottineau County Water Board, Bottineau County Road Dept.	\$20,000/ Lansford City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
40	Maxbass (Sanitary Lift Station on Martin Street)	Install shore power connection for generator	Severe Winter Storms and Summer Storms, Flooding Provide power to sanitary sewer lift station during power outage.	Maxbass City Council, Maxbass Public Works	Bottineau County Emergency Manager	\$3,500 / Maxbass City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
41	Maxbass	Removal of dead trees	Severe Winter Storms and Summer Storms, Reduce the risk of fire or power outage due to trees falling on power lines	Maxbass City Council, Maxbass Public Works	Maxbass Fire Dept.	\$6,000 / Maxbass City Council	On-going	Capital improvement plans, requires approval by city council
42	Newburg (Cenex Anhydrous Bulk Tank)	Relocate anhydrous ammonia bulk plant away from city	Hazardous Materials Incident, Homeland Security Plant is near residential area and high school poses safety and health hazard	Newburg City Council, Bottineau County LEPC	Bottineau County Emergency Manager, private industry (CHS)	\$250,000 / Newburg City Council	Estimated time of completion 2020	Capital improvement plans, planning and zoning, ordinances, requires approval by city council
43	Overly	Destruction or relocation of old buildings in city	Hazardous Materials Incident, Communicable Disease, Provide safe environment for residents and children	Overly City Council	Overly Public Works	\$10,000 / Overly City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
44	Overly (City Dump)	Install security	Hazardous Materials	Overly City Council	Overly Public Works	\$20,000 / Overly City	Estimated time of	Capital improvement

	Ground)	fence around dump	Incident Prevent unauthorized dumping of hazardous materials			Council	completion 2016	plans, requires approval by city council
45	Souris (2 miles east of Souris on south side of hwy)	Rip-rap around inside of four earthen containment walls of city sewage lagoon.	Hazardous Materials Incident Prevent erosion of containment walls that could contaminate water	Souris City Council	Souris Public Works Dept., N.D. Dept. of Health, First District Health Unit	\$50,000 / Souris City Council	Estimated time of completion 2018	Capital improvement plans, requires approval by city council
46	Souris (Corner of 1st Ave and West St.)	Construct a new bulk water fill station connected to city water main with pump and fill hose	Homeland Security Incident, Urban and Rural Fires Stop the current practice of bulk water filling taking place in the fire department. Prevent heavy trucks from tearing up city streets and security issues with leaving fire station unlocked	Souris City Council	Souris Public Works	\$30,000 / Souris City Council, Fire Departments	Estimated time of completion 2016	Capital improvement plans, requires approval by city council
47	Souris (on 1st Ave between Main St. and Minnesota St.)	Install concrete re-enforcement to footings on west side ladders of the water tower	Shortage of Critical Materials Stabilize water tower to prevent it from falling over and destroying the fire hall, nearby homes and businesses.	Souris City Council	Souris Public Works	\$1,500 / Souris City Council	Estimated time of completion 2016	Capital improvement plans, requires approval by city council
48	Souris (Fire Hall)	Purchase a 4" gas powered emergency water pump for flood response	Flooding Provide resources needed to quickly remove standing waters from the town reducing the flood water infiltration in homes and businesses	Souris Fire Dept., Souris City Council	Souris Public Works	\$10,000 / Souris City Council	Estimated time of completion 2016	Capital improvement plans, requires approval by city council
49	Willow City (old abandoned school house)	Remove stagnant water from basement of old school	Communicable Disease Stagnant water is a source of growing bacteria, mold,	Willow City City Council	Willow City Public Works, Willow City School Board	\$2,000 / Bottineau County and First District Health Unit	Estimated time of completion 2018	Capital improvement plans, requires approval by city council

		house	and harboring rats. Reduce health hazards for community					
50	Willow City (Fire Hall)	Install warning siren in city	Severe Winter Storms and Summer Storms Allow all residents to hear early warning siren	Willow City City Council	Willow City Fire Dept., Bottineau County Emergency Manager	\$25,000 / Willow City City Council and Fire Department	Estimated time of completion 2018	Capital improvement plans, requires approval by city council
51	Willow City (Corner of Prairie St. and Oak St. adjacent to Notre Dame des Victories Parish)	Modify building into adequate shelter	Severe Winter Storms and Summer Storms, Flooding, Transportation Accidents, Hazardous Materials, Shortage of Critical Materials, Provide shelter for residents in case of disaster	Willow City City Council, Bottineau County Emergency Manager	Notre Dame des Victories Parish, American Red Cross	\$20,000 / Willow City City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
52	Willow City (Corner of 3rd St. and Bottineau St.)	Install security door on the ladder on the water tower	Homeland Security Communicable Disease Prevent unauthorized tampering of water tower	Willow City City Council	Willow City Public Works	\$500 / Willow City City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
53	Willow City – Lift Station (Corner of hwy 60 and Bottineau St.)	Install shore power connection for generator	Severe Winter Storms and Summer Storms, Flooding, Transportation Accidents, Hazardous Materials, Shortage of Critical Materials, Provide power to sanitary sewer lift station during power outage.	Willow City City Council	Bottineau County Emergency Manager, Willow City Public Works	\$4,000 / Willow City City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
54	Willow City – West Lift Station (Prairie St.)	Install shore power connection for generator	Severe Winter Storms and Summer Storms, Flooding, Transportation Accidents, Hazardous Materials, Shortage of Critical	Willow City City Council	Bottineau County Emergency Manager, Willow City Public Works	\$4,000 / Willow City City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council

			Materials, Provide power to sanitary sewer lift station during power outage.					
55	Willow City	Purchase 30kw / 208 volt / 3 phase generator	Severe Winter Storms and Summer Storms, Flooding, Transportation Accidents, Hazardous Materials, Shortage of Critical Materials, Provide power to sanitary sewer lift station during power outage.	Willow City City Council	Bottineau County Emergency Manager, Willow City Public Works	\$4,000 / Willow City City Council	Estimated time of completion 2017	Capital improvement plans, requires approval by city council
56	Willow City	Replace sanitary sewer lift west of town	Severe Winter Storms and Summer Storms, Flooding, Prevent sewer backup in homes due to lift station failure	Willow City City Council	Willow City Public Works	\$100,000 / Willow City City Council	Estimated time of completion 2020	Capital improvement plans, requires approval by city council
57	Willow City	Relocate anhydrous ammonia bulk plant	Hazardous Materials Incident, Homeland Security Incident Prevent from Hazardous Materials incident from occurring	Willow City City Council	Bottineau County LEPC, private industry (Farmer's Union Oil Company)	\$250,000 / Willow City City Council	Estimated time of completion 2020	Capital improvement plans, planning and zoning, ordinances, requires approval by city council
58	Gardena	Identify and remove old buildings along city limits which are a fire hazard	Urban Fires, Wildfires Reduce hazard for fires by removing fuels	Gardena City Council, Gardena Public	Gardena Public Works, Bottineau Fire Dept.	\$10,000 / City of Gardena	Estimated completion 2020	Capital improvement plans, requires approval by city council
59	Bottineau	Study the feasibility to retain water to create wildlife habitat and divert water drainage North	Flood	Bottineau County Water Board, Bottineau County Commission, Bottineau City Commission	Bottineau County Water Board, Bottineau County Commission, Bottineau City Commission	\$20,000, Bottineau County Water Board, Bottineau County Commission, Bottineau City Commission	Estimated completion 2017	Public works and capital improvement plans, requires approval by city council

		of Bottineau away from critical facilities in NW Bottineau						
60	Bottineau	Complete the project to retain water to create wildlife habitat and divert water drainage North of Bottineau away from critical facilities in NW Bottineau	Flood	Bottineau County Water Board, Bottineau County Commission, Bottineau City Commission	Bottineau County Water Board, Bottineau County Commission, Bottineau City Commission	\$100,000 Bottineau County Water Board, Bottineau County Commission, Bottineau City Commission	Estimated completion 2020	Capital improvement plans, requires approval by city council
61	Lake Metigoshe and surrounding rural area.	Fire Hall addition or replacement	All Hazards	Bottineau Rural Fire Department	Bottineau County Commission, Bottineau Rural Fire Department	\$50,000, Local tax funding	Estimated completion 2020	Capital improvement plans, requires approval by city council
62	Bottineau County	Construct a storage facility for Dive/Rescue Vehicle	Flood	Bottineau Ambulance and Dive/Rescue Team	Bottineau County Commission	\$50,000, Local tax funding, donations	Estimated completion 2020	Capital improvement plans, requires approval by city council
63	Antler	Upgrade Grass Unit	Wildland Fire	Antler Fire Department	None	\$150,000, Grants, local funding	Estimated completion 2020	Capital improvement plans, requires approval by city council
64	Antler	Purchase Thermal Imager	Urban and Wildland Fire	Antler Fire Department	City of Antler, Bottineau County Commission	\$10,000, Grants, Local Funding	Estimated completion 2018	Capital improvement plans, requires approval by city council
65	Newburg	Participate in NFIP	Flood	Newburg City Commission	Newburg City Commission, Bottineau County Emergency Manager, ND State Water Commission	None	On-going	Public-private partnership, requires approval by city council
66	Newburg	Plant a living snow fence	Severe Winter Weather	Newburg City Commission	Newburg City Commission, Bottineau County Soil Conservation, ND Forest Service	\$10,000, Grants, Local Funding	Estimated completion 2018	Capital improvement plans, requires approval by city council

67	Newburg	Upgrade Fire Truck Pumper w/ a larger tank and pump	Urban and Wildland Fire	Newburg City Commission, Newburg Fire Department	Newburg City Commission, Newburg Fire Department, Newburg Fire District	\$75,000, Grants Local Funding	Estimated completion 2020	Capital improvement plans, requires approval by city council
68	Maxbass	Demolish old vacant buildings	Urban Fire, Disease	Maxbass City Commission	Maxbass City Commission,	\$10,000, Property Owners, Maxbass City Commission	Estimated completion 2018	Capital improvement plans, requires approval by city council
69	Maxbass	Participate in NFIP	Flood	Maxbass City Commission	Maxbass City Commission, Bottineau County Emergency Manager, ND State Water Commission	None	On-going	Capital improvement plans, requires approval by city council
70	Maxbass	Upgrade Fire Truck Tanker	Urban and Wildland Fire	Maxbass City Commission, Maxbass Fire Department	Maxbass City Commission, Maxbass Fire Department, Maxbass Fire District	\$150,000, Grants Local Funding	Estimated completion 2020	Capital improvement plans, requires approval by city council
71	Bottineau	Clean up junkyard lot and/or fence in the lot	Hazardous Materials, Disease	Bottineau City Commission	Property Owner, 1 st District Health	None, property owner responsibility	Estimated completion 2017	Capital improvement plans, requires approval by city council
72	Lansford	Conduct a study to determine the cause of flooding in Lansford and develop a project to mitigate flooding.	Flooding	Lansford City Commission	Lansford City Commission, Bottineau County Water Board	\$10,000	Estimated completion 2018	Public works and capital improvement plans, requires approval by city council
73	Bottineau County	Select one of three methods to lower the water level of Boundary Lake and complete the project. (See Appendix F for background information and project proposals)	Flooding	Bottineau County Water Board	Boundary Lake Cabin Owners, County Commissioners, State Water Commission, Possibly Manitoba Province	Unknown	Estimated completion 2020	Public works and capital improvement plans, requires approval by city council

74	Bottineau County (Gardena, Kramer, Overly, Westhope)	Install fire breaks around city limits to mitigate impacts of wildland fire.	Wildland Fire	Bottineau County Commission	Bottineau County Emergency Management, Gardena City Council, Kramer City Council, Overly City Council, Westhope City Council	City specific	Estimated completion of 2018	Capital improvement plans, requires approval by county commission
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5.3 Project Prioritization

Each of the proposed projects has value, however, time and financial constraints do not permit all of the proposed actions to be implemented immediately. By prioritizing the actions, the most critical, cost effective projects can be achieved in the short term. The prioritization of the projects serves as a guide for choosing and funding projects, however, depending on the funding sources, some actions may be best achieved outside the priorities established here. In addition, the jurisdictions vary in their mitigation capabilities and may target priorities within their own specific jurisdictions.

Table 5.2.2A identified specific actions to achieve identified goals, an appropriate responsible party for each action, a schedule for accomplishment, suggested funding sources and priority rankings. Table 5.3B provides the basis for this initial prioritization of the actions using the STAPLEE criteria (Table 5.3A). STAPLEE is an acronym utilized to determine if a project is socially acceptable, technically feasible, administrative possible, politically acceptable, legal, economical (cost/benefit), and environmentally sound. In drafting this initial prioritization, the Bottineau County Office of Emergency Management and the Hazard Mitigation Planning Committee worked cooperatively to determine which STAPLEE criteria each action did or was likely to meet. The criteria that were considered “met” are identified with a “+” and the criteria that were considered not met are identified with a “0”. The methodology also allows for a “-” designation when impacts are expected to be negative, but none of the projects required this rating at this time.

The benefit-cost review is depicted in the economic criteria of the STAPLEE designation. The planning team considered the benefits that will result from a mitigation action versus the cost. A full benefit-cost analysis, such as the FEMA Benefit-Cost Analysis Toolkit was not considered necessary but a planning-level assessment of whether the costs are reasonable compared to the probable benefits was evaluated. The cost estimates are based on experience and judgment of the planning team. The assessment was mailed to all planning team members and the County-wide Hazardous Materials Awareness Campaign project was added as a result of their feedback.

The committee in this process defined High, Medium, and Low priorities to be assigned as follows:

- High: STAPLEE criteria score of 31 to 35
- Medium: STAPLEE criteria of 25 to 30
- Low: STAPLEE criteria of 24 or lower

This prioritization will be revisited in the future by the Bottineau County Office of Emergency Management and the Hazard Mitigation Planning Committee as the plan goes through its annual reviews.

Table 5.3A FEMA’s STAPLEE Criteria

Criteria	Considerations
Social	Community Acceptance Effects on Segment of Population
Technical	Technical Feasibility Long-Term Solution Secondary Impacts
Administrative	Staffing Funding Allocated Maintenance/Operations
Political	Political Support Local Champion or Proponent Public Support
Legal	State Authority Local Authority Subjectivity to Legal Challenges
Economic	Benefit of Action Cost of Action Contribution to Economic Goals Outside Funding Requirement
Environmental	Effects on Land/Water Bodies Effects on Endangered Species Effects on Hazardous Material and Waste Sites Consistency with Community Environmental Goals Consistency with Federal Laws

Source: Federal Emergency Management Agency, 2003.

Table 5.3B Bottineau County Hazard Mitigation Project Prioritization

#	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
1	Yearly inspection to keep drains free of weeds, trees and other debris	5	5	4	3	5	5	4	31	High
2	Public notice to the public to cut ditches in the fall. County and landowners cut county roads and clear culverts.	5	5	5	5	5	5	5	35	High
3	Inform the public of the potential for flooding. Due to geography, a flood situation only occurs along the Mouse River Watershed, Monitor moisture	5	5	5	5	5	5	5	35	High

#	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
	content. Conduct a campaign to keep the public informed about the flood potential. County officials leave this to individual communities and townships. Bottineau County Road Dept. has repaired most of the roads that were damaged.									
4	The Water Board is attempting to study and implement a project for creek drainage.	5	5	4	4	5	3	4	30	Med.
5	Inform public aware of impassible roads or closed roads during winter weather events.	5	5	5	5	5	5	5	35	High
6	Inform public of winter and summer weather events through exercises, workshops, and literature.	5	5	5	5	5	5	5	35	High
7	Inform the public of the importance of adopting plans and procedures for tornado drills.	5	5	5	5	5	5	5	35	High
8	Training for storm spotters network.	5	5	5	5	5	5	5	35	High
9	Encourage hazardous material dealers to inform employees and customers of dangers and safety procedures that must be followed. Provide informational meetings and brochures.	5	5	3	3	4	5	5	30	Med.
10	Training of personnel in the safety procedures of chemical spills.	5	5	5	5	5	5	5	35	High
11	Implement public awareness campaigns utilize media and literature to inform the public of hazards of grass fires and how to prevent them.	5	5	5	5	5	5	5	35	High
12	Complacency of the people in the United States is a problem in urban fire public awareness. The measure must be implemented immediately and is to be continued indefinitely. Local officials must initiate and take the lead role in this measure in regard to public awareness.	5	5	5	5	5	5	5	35	High
13	Widen roads with outlets for fire protection in the Turtle Mountain – Lake Metigoshe area and also develop wide fire breaks; install additional hydrant system in lake area	4	5	5	3	5	3	4	29	Med.
14	Inform public of fire index and regulations regarding burning during high fire indexes. Place burn ban in drought areas.	5	5	5	5	5	5	5	35	High
15	Inform public as to crucial water supplies and ban unnecessary use of water. Conserve water and locate alternative water supplies.	5	5	5	5	5	5	5	35	High
16	Put up fence around water and sewer	5	5	5	5	5	3	5	33	High

#	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
17	Put up fence around water and sewer	5	5	5	5	5	3	5	33	High
18	Put up fence around water supply	5	5	5	5	5	3	5	33	High
19	Training of emergency personnel. Provide training and exercises for personnel to deal with events	5	5	5	5	5	3	5	33	High
20	First Responder equipment for spill containment of high pressure oil pipelines and oil tankers	5	5	5	5	5	3	5	33	High
21	Demolish old abandoned buildings in Antler	4	4	4	4	3	4	2	25	Low
22	Move anhydrous ammonia and propane bulk plants out of town a safe distance to the southeast along the railroad tracks	5	5	5	3	2	4	5	29	Med.
23	Install five additional early warning siren around the city	5	5	5	5	5	4	5	34	High
24	Conduct an Emergency Preparedness Campaign for citizens to recognize what to do in response to different emergencies. Could consist of distribution of flyer, radio and newspaper ads, and public meetings. Publish emergency phone numbers with instructions of how and when to use them.	5	5	5	5	5	5	5	35	High
25	Purchase equipment for shelters in the county (churches and schools) shore power connections for generators for loss of power	5	5	5	5	5	3	5	33	High
26	Install shore power connections for generator hook up at city well heads	5	5	5	5	5	4	5	34	High
27	Purchase 4 – 30kw / 3 phase emergency generators to use within city and county during power outage	5	5	5	5	5	3	5	33	High
28	Purchase a 125kw / 3 phase emergency generator to power the school during extended power outage.	5	5	5	5	5	3	5	33	High
29	Clean out drainage ditches at the north and west sides of town for storm water runs out of town instead of flooding town	5	5	4	4	5	5	5	33	High
30	Establish gauging stations on Oak Creek, Boundary Creek, Willow Creek, Stone Creek, and Cutbank Creek	5	5	3	5	5	4	5	32	High
31	Construct detention ponds on Oak Creek mainly in the Turtle Mountain area	5	5	4	5	5	3	3	30	Med.
32	Purchase 30kw / 208 volt / 3 phase generator	5	5	5	5	5	3	5	33	High

#	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
33	Install shore power connection for generator	5	5	5	5	5	3	5	33	High
34	Perform environmental hazard and safety assessment	5	5	5	5	5	5	5	35	High
35	Install new culverts and clean out storm drainage	5	5	4	4	5	4	4	31	High
36	Install shore power connection for generator	5	5	5	5	5	3	5	33	High
37	Purchase 30kw / 208 volt / 3 phase generator	5	5	5	5	5	3	5	33	High
38	Clean debris and vegetation from 300 yards of drain ditch on south side of town	5	5	4	4	5	4	4	31	High
39	Clean debris and vegetation from ¼ mile of drain ditch on east side of town	5	5	4	4	5	4	4	31	High
40	Install shore power connection for generator	5	5	5	5	5	3	5	33	High
41	Removal of dead trees	5	5	5	5	5	5	4	34	High
42	Relocate anhydrous ammonia bulk plant away from city	5	5	5	3	2	4	5	29	Med.
43	Destruction or relocation of old buildings in city	4	4	4	4	3	4	2	25	Low
44	Install security fence around dump	5	5	5	5	5	3	5	33	High
45	Rip-rap around inside of four earthen containment walls of city sewage lagoon.	5	5	4	5	5	3	5	32	High
46	Construct a new bulk water fill station connected to city water main with pump and fill hose	5	5	5	5	5	3	5	33	High
47	Install concrete re-enforcement to footings on west side ladders of the water tower	5	5	5	5	5	3	5	33	High
48	Purchase a 4" gas powered emergency water pump for flood response	5	5	5	5	5	3	5	33	High
49	Remove stagnant water from basement of old school house	5	5	5	4	4	4	3	29	Med.
50	Install warning siren in city	5	5	5	5	5	4	5	34	High

#	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
51	Modify building into adequate shelter	5	5	5	5	5	3	5	33	High
52	Install security door on the ladder on the water tower	5	5	5	5	5	5	5	35	High
53	Install shore power connection for generator	5	5	5	5	5	3	5	33	High
54	Install shore power connection for generator	5	5	5	5	5	3	5	33	High
55	Purchase 30kw / 208 volt / 3 phase generator	5	5	5	5	5	3	5	33	High
56	Replace sanitary sewer lift west of town	5	5	5	5	5	3	5	33	High
57	Relocate anhydrous ammonia bulk plant	5	5	5	3	2	4	5	29	Med.
58	Identify and remove old buildings along city limits which are a fire hazard	4	4	4	4	3	4	2	25	Low
59	Study the feasibility to retain water to create wildlife habitat and divert water drainage North of Bottineau away from critical facilities in NW Bottineau	5	5	4	4	5	3	4	30	Med.
60	Complete the project to retain water to create wildlife habitat and divert water drainage North of Bottineau away from critical facilities in NW Bottineau	5	5	4	4	5	3	4	30	Med.
61	Fire Hall addition or replacement	5	5	5	5	5	2	5	32	Med.
62	Construct a storage facility for Dive/Rescue Vehicle	5	5	5	5	5	5	2	5	32
63	Upgrade Grass Unit	5	5	5	5	5	2	5	32	High
64	Purchase Thermal Imager	5	5	5	5	5	2	5	32	High
65	Participate in NFIP	5	5	5	5	5	5	5	35	High
66	Plant a living snow fence	5	5	5	3	5	5	4	32	High
67	Upgrade Fire Truck Pumper w/ a larger tank and pump	5	5	5	5	5	2	5	32	High
68	Demolish old vacant buildings	4	4	4	4	3	4	2	25	Low
69	Participate in NFIP	5	5	5	5	5	5	5	35	High

#	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
70	Upgrade Fire Truck Tanker	5	5	5	5	5	2	5	32	High
71	Clean up junkyard lot and/or fence in the lot	5	5	4	4	5	3	5	31	High
72	Conduct a study to determine the cause of flooding in Lansford and develop a project to mitigate flooding.	5	5	4	4	5	3	4	30	Med.
73	Select one of three methods to lower the water level of Boundary Lake and complete the project. (See Appendix F for background information and project proposals)	5	5	2	2	1	3	2	20	Low
74	Install fire breaks around city limits to mitigate impacts of wildland fire.	5	5	4	4	3	5	4	30	Med.

5.4 Project Implementation and Legal Framework

The county will use the STAPLEE criteria to focus project prioritization. Mitigation projects will be considered for funding through federal and state grant programs, and when other funds are made available through the county. The LEPC, a consortium of local officials and disaster planning personnel, will be the coordinating agency for project implementation. The LEPC has the capacity to organize resources, prepare grant applications, and oversee project implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of, or responsible for, implementing activities and programs. Government in Bottineau County consists of county government, 4 incorporated cities, and 18 townships, each with the potential to create their own land use laws. Currently, the county and each incorporated city have a planning and zoning authority that develops and enforces land use laws. The emergency manager will be responsible for mitigation project administration. A number of state and local regulations and policies form the legal framework available to implement Bottineau County’s hazard mitigation goals and projects. A list of these regulations and plans is presented below:

State of North Dakota

- North Dakota Subdivision and Platting Act
- North Dakota building codes
- North Dakota Sanitation in Subdivision

Local

- Bottineau County Zoning Resolution

As the jurisdictions develop new plans and existing plans are updated, the new plans and updates will utilize the hazard information and projects identified in this mitigation plan for consideration and inclusion. Given that limited planning mechanisms exist in the county and jurisdictions, the information in this mitigation plan will be valuable for future planning efforts. Table 5.4A shows examples of projects and how they can be incorporated into existing and future planning documents. Note that some proposed mechanisms may not be feasible at this time or any time in the near future due to the staff, technical expertise, and financial resources need to implement the program.

Table 5.4A Incorporation into Existing and Future Plans and Mechanisms

Existing or Anticipated Plan or Mechanism	Mitigation Strategies
Building Codes	<ul style="list-style-type: none"> ▪ Adopt building codes that require disaster resistance to hazards such as severe thunderstorms, wind, tornadoes, structure fires, structure collapses, floods, dam failures, wildland/rural fires, winter storms, and terrorism.
Capital Improvement Plans	<ul style="list-style-type: none"> ▪ When developed or updated, consider and include projects related to hazard mitigation, such as transportation and public utility infrastructure improvements, in the capital improvements schedule.
Land Use Plans	<ul style="list-style-type: none"> ▪ During updates, add hazard considerations for future land use designations.
Subdivision Regulations	<ul style="list-style-type: none"> ▪ Update subdivision regulations to require disaster resistance to hazards such as severe thunderstorms, wind, tornadoes, structure fires, structure collapses, floods, dam failures, wildland/rural fires, winter storms, and terrorism.
Zoning	<ul style="list-style-type: none"> ▪ Adopt zoning regulations that create disaster resistance such as mobile tie down requirements and floodplain regulations.
Bottineau County Emergency Operations Plan	<ul style="list-style-type: none"> ▪ Integrate the operational, response, training, and preparedness needs that are not directly tied to mitigation into the county’s emergency operation plan.

Note: Some activities such as building codes and land use regulations are more easily implemented by some communities than others because of the community, planning, and enforcement resources available.

5.5 Funding Sources

Funding for mitigation projects exists from a multitude of sources. Some sources may be specifically designed for disaster mitigation activities, while others may have another overarching purpose that certain mitigation activities may qualify for. Most mitigation funding sources are recurring through legislation or government support. Some, however, may be from an isolated instance of financial support. Whenever possible, creative financing is encouraged. Often, additional funding sources are found through working with other agencies and businesses to identify common or complementary goals and objectives. Table 5.5A shows the programs that may be available to Bottineau County and the incorporated jurisdictions. The traditional mitigation programs that are especially relevant for the county and communities are shown in bold.

Table 5.5A Mitigation Funding Sources

Name	Description	Managing Agencies
AmeriCorps	Provides funding for volunteers to serve communities, including disaster prevention.	<ul style="list-style-type: none"> ▪ Corporation for National & Community Service
Assistance to Firefighters Grants	Provides funding for fire prevention and safety activities and firefighting equipment.	<ul style="list-style-type: none"> ▪ Department of Homeland Security
Clean Water Act Section 319 Grants	Provides grants for a wide variety of activities related to non-point source pollution runoff mitigation.	<ul style="list-style-type: none"> ▪ US Environmental Protection Agency
Community Development Block	Provides funding for sustainable	<ul style="list-style-type: none"> ▪ US Housing and Urban

Name	Description	Managing Agencies
Grant (CDBG)	community development, including disaster mitigation projects.	Development
Economic Development Administration (EDA) Grants and Investments	Invests and provides grants for community construction projects, including mitigation activities.	<ul style="list-style-type: none"> ▪ US Economic Development Administration
Emergency Watershed Protection	Provides funding and technical assistance for emergency measures such as floodplain easements in impaired watersheds.	<ul style="list-style-type: none"> ▪ US Natural Resources Conservation Service
Environmental Quality Incentives Program	Provides funding and technical assistance to farmers and ranchers to promote agricultural production and environmental quality as compatible goals.	<ul style="list-style-type: none"> ▪ US Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMA)	Provides pre-disaster flood mitigation funding (with priority for repetitive flood loss properties under the National Flood Insurance Program).	<ul style="list-style-type: none"> ▪ North Dakota State Water Commission ▪ FEMA – Region VIII
Hazard Mitigation Grant Program (HMGP)	Provides post-disaster mitigation funding.	<ul style="list-style-type: none"> ▪ North Dakota Department of Emergency Services ▪ FEMA – Region VIII
Hazardous Fuels Mitigation Program	Provides funding for the reduction of hazardous wildfire fuels.	<ul style="list-style-type: none"> ▪ US Bureau of Land Management
Homeland Security Grants	Through multiple grants, provides funding for homeland security activities. Some projects can be considered mitigation.	<ul style="list-style-type: none"> ▪ North Dakota Department of Emergency Services ▪ US Department of Justice ▪ US Department of Homeland Security
Housing and Urban Development (HUD) Grants	Provides a number of grants related to safe housing initiatives.	<ul style="list-style-type: none"> ▪ US Housing and Urban Development
Individual Assistance (IA)	Following a disaster, funds can mitigate hazards when repairing individual and family homes.	<ul style="list-style-type: none"> ▪ North Dakota Department of Emergency Services ▪ FEMA – Region VIII
Law Enforcement Support Office 1033 Program	Provides surplus military property to local law enforcement agencies.	<ul style="list-style-type: none"> ▪ North Dakota National Guard
Map Modernization Program	Provides funding to establish or update floodplain mapping.	<ul style="list-style-type: none"> ▪ North Dakota State Water Commission ▪ FEMA – Region VIII

Name	Description	Managing Agencies
National Fire Plan (NFP)	Provides funding for pre-disaster wildfire mitigation.	<ul style="list-style-type: none"> ▪ North Dakota Forest Service ▪ US Forest Service
National Wildlife Wetland Refuge System	Provides funding for the acquisition of lands into the federal wildlife refuge system.	<ul style="list-style-type: none"> ▪ US Fish and Wildlife Service
North American Wetland Conservation Fund	Provides funding for wetland conservation projects.	<ul style="list-style-type: none"> ▪ US Fish and Wildlife Service
NRCS Conservation Programs	Provides funding through a number of programs for the conservation of natural resources.	<ul style="list-style-type: none"> ▪ US Natural Resources Conservation Service
Partners for Fish and Wildlife	Provides financial and technical assistance to landowners for wetland restoration projects in “Focus Areas” of the state.	<ul style="list-style-type: none"> ▪ US Fish and Wildlife Service
Pre-Disaster Mitigation (PDM) Grants	Provides grants through a competitive process for specific mitigation projects, including planning.	<ul style="list-style-type: none"> ▪ North Dakota Department of Emergency Services ▪ FEMA – Region VIII
Public Assistance (PA)	Following a disaster, funds can be used to mitigate hazards when repairing damages to public structures or infrastructure.	<ul style="list-style-type: none"> ▪ North Dakota Department of Emergency Services ▪ FEMA – Region VIII
Repetitive Flood Claims (RFC) Grant	Provides funding to reduce flood damages to insured properties that have had one or more claims to the NFIP.	<ul style="list-style-type: none"> ▪ North Dakota State Water Commission ▪ FEMA – Region VIII
Rural Development Grants	Provides grants and loans for infrastructure and public safety development and enhancement in rural areas.	<ul style="list-style-type: none"> ▪ US Department of Agriculture, Rural Development
Rural Fire Assistance (RFA) Grant	Funds fire mitigation activities in rural communities.	<ul style="list-style-type: none"> ▪ National Interagency Fire Center
SBA Pre-Disaster Mitigation Loan Program	Provides low-interest loans to small businesses for mitigation projects.	<ul style="list-style-type: none"> ▪ US Small Business Administration (SBA)
Severe Repetitive Loss (SRL) Grant	Provides funding to reduce flood damages to residential insured properties that have had at least four claims to the NFIP.	<ul style="list-style-type: none"> ▪ North Dakota State Water Commission ▪ FEMA – Region VIII
Small Flood Control Projects	Authority of USACE to construct small flood control projects.	<ul style="list-style-type: none"> ▪ US Army Corps of Engineers (USACE)
Streambank & Shoreline	Authority of USACE to construct	<ul style="list-style-type: none"> ▪ US Army Corps of Engineers

Name	Description	Managing Agencies
Protection	streambank stabilization projects.	(USACE)
Wetland Program Development Grants (WPDGs)	Provides funding for studies related to water pollution prevention.	<ul style="list-style-type: none"> ▪ US Environmental Protection Agency

This list of potential funding sources is certainly not all inclusive. Many opportunities for mitigation funding exist both in the public and private sectors such as businesses, foundations, and philanthropic organizations.

6. PLAN MONITORING AND MAINTENANCE

An important aspect of any useable plan is the maintenance and upkeep of the document. Policies and procedures established in this plan reflect the current hazard mitigation philosophy at the county, city, and township levels. Changes in hazard mitigation programs and/or priorities, including changes in legislation and available funding, may necessitate modifications to this plan. To facilitate and ensure the plan will remain viable for Bottineau County and the incorporated jurisdictions for many years, the plan maintenance responsibilities lie with the Bottineau County Emergency Management Office. In general, the Emergency Management Office is responsible for coordinating emergency planning issues for the county and communities. Given the broad interaction emergency management has with a variety of agencies, this office maximizes the involvement of others in mitigation planning and maintenance.

6.1 Plan Monitoring

The plan will be monitored annually by the Bottineau County Emergency Management Office through an internal review process. This office will make a performance review for each hazard within the plan for updating purposes. Also, land use, comprehensive, and strategic plans will be monitored as related to the Multi-Hazard Mitigation Plan. The emergency management office will maintain a list of mitigation projects completed for inclusion in Appendix G.

6.2 Plan Evaluation

The initial evaluation of the plan will be conducted by the Bottineau County Emergency Management Office as needed throughout the five year plan update cycle. If needed, contact with the jurisdictions and other stakeholders will be made during the evaluation process to solicit additional input. The methods of implementing and maintaining the plan will be evaluated for successes and improvements. Changes to the implementation schedule or plan maintenance will be made as needed to ensure hazard mitigation activities continue. The evaluation will consider the effectiveness of the programs, changes in land development, and other programs that may affect mitigation priorities. New stakeholders and interested parties will be identified and invited to participate in the implementation process. Should a hazard event have occurred during the previous year in which a mitigation project was a factor, either positive or negative, a summary report, including avoided losses, will be written and included in Appendix G.

6.3 Plan Updates

As disasters occur, projects are completed, and hazard information is improved, the Bottineau County Multi-Hazard Mitigation Plan will need to be updated. To remain an active and approved plan, an updated plan must be submitted to the North Dakota Department of Emergency Services and the Federal Emergency Management Agency every five years. The next formal submission is required in 2020. To facilitate the update process, annual updates to the plan are recommended. Updates to the Multi-Hazard Mitigation Plan will be added to the yearly work plan of the Bottineau County Emergency Manager. All disaster or emergency incidents will be evaluated for general/specific mitigation recommendations to be added to the plan. Table 6.3A shows the schedule of plan updates.

Table 6.3A Schedule of Plan Updates

Plan Section	Post-Disaster	Annually	Every 5 Years
Introduction			X
Planning Process and Methodologies	X	X	X
Critical Facilities and Infrastructure			X
Population and Structures			X
Economic, Ecologic, Historic, and Social Values			X
Current Land Use			X
New Development		X	X
Future Development		X	X
Hazard Profiles	X	X	X
Risk Assessment Summary			X
Purpose, Goals, and Objectives	X	X	X
Potential Actions (Projects)	X	X	X
Project Prioritization	X	X	X
Project Implementation and Legal Framework	X	X	X
Funding Sources	X		X
Plan Monitoring and Maintenance		X	X
Appendices	X	X	X

6.4 Implementation through Existing Programs

6.4.1 Local Plan Implementation from 2010 Hazard Mitigation Plan

The 2010 Hazard Mitigation Plan has been used extensively to update and develop other Bottineau County Plans. Plans that derived information from the 2009 Hazard Mitigation Plan are listed in Table 6.4A below.

Table 6.4A Local Plans Implemented from the 2010 Hazard Mitigation Plan

Plans Developed with Information from the 2010 Hazard Mitigation Plan	Information gleaned from the 2010 Hazard Mitigation Plan
Bottineau County Hazardous Materials Emergency Response Plan	Hazardous Materials fixed facilities Hazardous Materials transportation routes (rail and highway) Hazardous Materials Pipelines
Bottineau County Local Emergency Operations Plan	Hazard Analysis Risk Assessment Planning Committee Members (Functional and Task Coordinators)
Bottineau County Public Health Emergency Operations Plan	Hazard Analysis Risk Assessment
Bottineau County Wildfire Protection Plan	Hazard Analysis

Plans Developed with Information from the 2010 Hazard Mitigation Plan	Information gleaned from the 2010 Hazard Mitigation Plan
	Risk Assessment
Bottineau County Mass Care plan	Hazard Analysis Risk Assessment
Terrorism Annex to Bottineau County LEOP	Hazard Analysis Risk Assessment

The multi-hazard mitigation plan provides a series of projects – many of which will be closely related to the goals and objectives of the county growth policy. Bottineau County will have the opportunity to implement hazard mitigation projects through existing programs and procedures. Local officials will work with the county departments to ensure hazard mitigation projects are consistent with planning goals and integrate them, where appropriate.

The Building Inspector offices and fire departments are responsible for administering the building codes in local municipalities. After the adoption of the mitigation plan, they will work with the State Building Code Office to make sure that the county adopts, and is enforcing, the minimum standards established in the state building codes. In addition, the county building department will work with other agencies at the state level to review, develop and ensure building codes that are adequate to mitigate or prevent damage by natural hazards. This is to ensure that life-safety criteria are met for new construction. The Local Emergency Operations Plan, the LEOP Terrorism Annex, the Wildfire Protection Plan, the Public Health Emergency Operations Plan, and the Bottineau County Hazardous Materials Plan are county-wide plans that will draw information from the Multi-Hazard Mitigation Plan for pertinent updates.

Within six months of formal adoption of the multi hazard mitigation plan, mitigation goals will be incorporated into the county comprehensive growth policy. Meetings of the board will provide an opportunity for local officials to report back on the progress made on the integration of mitigation planning elements into county planning documents and procedures.

6.4.2 Local Plan Implementation from 2015 Hazard Mitigation Plan

The 2015 Hazard Mitigation Plan will be used extensively to update other Bottineau County Plans. Plans that will derive information from the 2015 Hazard Mitigation Plan are listed in Table 6.4B below. All incorporated jurisdictions in Bottineau County participate in the county plans listed in the table.

Table 6.4B Local Plans Implemented from the 2015 Hazard Mitigation Plan

Plans Developed with Information from the 2015 Hazard Mitigation Plan	Information gleaned from the 2015 Hazard Mitigation Plan
Bottineau County Hazardous Materials Emergency Response Plan	Hazardous Materials fixed facilities Hazardous Materials transportation routes (rail and highway) Hazardous Materials Pipelines
Bottineau County Local Emergency Operations Plan	Hazard Analysis

	Risk Assessment Planning Committee Members (Functional and Task Coordinators)
Bottineau County Public Health Emergency Operations Plan	Hazard Analysis Risk Assessment
Bottineau County Wildfire Protection Plan	Hazard Analysis Risk Assessment
Bottineau County Mass Care plan	Hazard Analysis Risk Assessment
Terrorism Annex to Bottineau County LEOP	Hazard Analysis Risk Assessment

6.5 Continued Public Involvement

Bottineau County and the incorporated jurisdictions are dedicated to involving the public directly in the review and updates of the Multi-Hazard Mitigation Plan. A copy of the Multi-Hazard Mitigation Plan will be available for review at the Bottineau County Emergency Management Office. The public is also invited to attend all public meetings related to the mitigation plan to provide input and feedback. In an effort to solicit involvement, appropriate public notices will be distributed prior to public meetings, encouraging the public to attend and provide comment. Year round, written comments may also be submitted to the Bottineau County Emergency Management Office at:

Bottineau County Emergency Management
314 5th Street West
Bottineau, ND 58318

A series of public meetings will also be held prior to each annual review and five year update, or at lesser intervals when deemed necessary by the board. The meetings will provide the public a forum for which they can express their concerns, opinions, or ideas about the plan. The emergency manager will be responsible for using county resources to publicize the annual public meetings and maintain public involvement through the newspapers and other communication channels.

Hazard profiles define the frequency, location, and intensity of hazards that may impact a community. Profiles were developed for hazards that historically have had the most effect on the community and the ones that the community identified as being of most concern during public meetings.

The frequency of past hazard events was calculated to determine the probability of future hazards occurring. Accurate and consistent records have not been kept for many hazards. Where records have been kept, they are often heavily biased towards only reflecting hazards that occurred in the more populated areas of the jurisdiction. Data from the NOAA National Climate Data Center Storm Events database and the North Dakota Department of Emergency Services was used to compile frequencies of natural hazards.

Hazard impact areas describe to what geographic extent a hazard can impact a jurisdiction and are uniquely defined on a hazard-by-hazard basis as discussed below. For purposes of conducting the risk analysis, all the hazard impact areas were defined as the percentage of area in each census block that would be affected.

The hazards most likely to affect Bottineau County were derived from a number of sources. Hazard information was compiled by examining data from Department of Emergency Services, FEMA, and the NWS, reviewing historical newspaper articles, and interviewing local experts. Most importantly, during the public meeting, the residents of Bottineau County voiced their opinions on what hazards had affected their lives and their communities.

Appendix A Letters of Intent

Bottineau County North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [County of Bottineau] is submitting this letter of commitment to confirm that {county of Bottineau} has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi-Hazard Mitigation Planning revision.

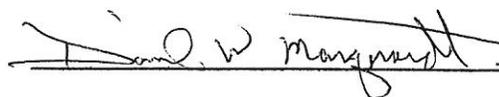
Further, as a condition to participating in the mitigation planning; [County of Bottineau] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

^{Bottineau County}
[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I Daniel Marquardt commit (County of Bottineau) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 30 day of Oct 2014



City Of Antler North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Antler] is submitting this letter of commitment to confirm that [City of Antler] has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi-Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Antler] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; Bruce Hanson commit (City of Antler) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 28 day of October, 2014



City Of Bottineau North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Bottineau] is submitting this letter of commitment to confirm that (City of Bottineau) has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi-Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Bottineau] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I Ben Hu Fork commit (City of Bottineau) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 9 day of September



City Of Gardena North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Gardena] is submitting this letter of commitment to confirm that {City of Gardena} has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Gardena] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I *Scott Lee* commit (City of Gardena) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 8 day of September 2014

Scott Lee

City Of Kramer North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Kramer] is submitting this letter of commitment to confirm that [City of Kramer] has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi-Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning, [participating jurisdiction/community] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; IKMYRON BRANDT commit (City of Kramer) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 3 day of SEPTEMBER, 2014

x Myron Brandt

City Of Landa North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Landa] is submitting this letter of commitment to confirm that (City of Landa) has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

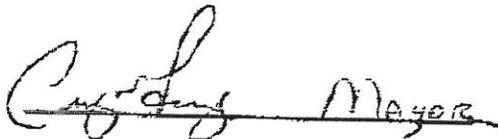
Further, as a condition to participating in the mitigation planning, [City of Landa] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I CRAIG GEORGE commit (City of Landa) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 8 day of SEPT



Mayor

City Of Lansford North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Lansford] is submitting this letter of commitment to confirm that {City of Lansford} has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Lansford] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of ^{Lansford} ~~Kramer~~] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I Shawn Nett commit (City of Lansford) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 18 day of Sept. 2014



City Of Maxbass North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Maxbass] is submitting this letter of commitment to confirm that (City of Maxbass) has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Maxbass] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of ~~Maxbass~~] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I KEVIN B. NAUMANN commit (City of Maxbass) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 9 day of Sept. 14



City Of Newburg North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Newburg] is submitting this letter of commitment to confirm that {City of Newburg} has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Newburg] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of ^{Newburg} Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I William Deschamps commit (City of Newburg) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 8 day of 9

William Deschamps

City Of Overly North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Overly] is submitting this letter of commitment to confirm that {City of Overly} has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi-Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Overly] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I Harry W. Staley commit (City of Overly) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 5th day of Sept 2014

Mayor Harry W. Staley

City Of Souris North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Souris] is submitting this letter of commitment to confirm that {City of Souris} has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

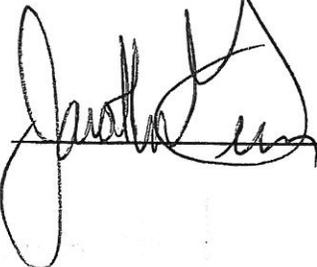
Further, as a condition to participating in the mitigation planning; [City of Souris] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of ~~Komer~~^{Souris}] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I, _____ commit (City of Souris) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 18 day of oct



City Of Westhope North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Westhope] is submitting this letter of commitment to confirm that {City of Westhope} has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Westhope] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I Margo Helgeson commit (City of Westhope) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 8 day of September

Margo Helgeson

City Of Willow City North Dakota
[9-3-2014]

Rick Hummel, Emergency Manager
Bottineau County
314 5th St West
Bottineau, ND 58318

Re: Letter of Commitment as participating jurisdiction/community in Bottineau County Multi-Jurisdictional/Community Hazard Mitigation Planning revision.

Dear Lead Community Agent,

As the Federal Emergency Management Agency's (FEMA) Local Mitigation Plan requirements under 44 CFR §201.6 specifically identify criteria that allow for multi-jurisdictional/community mitigation plans and that many issues are better resolved by evaluating hazards more comprehensively by coordinating at the tribal, county, regional, or watershed level, the [City of Willow city] is submitting this letter of commitment to confirm that (City of Willow City) has agreed to participate in the Bottineau County Multi-Jurisdictional/Community Multi- Hazard Mitigation Planning revision.

Further, as a condition to participating in the mitigation planning; [City of Willow City] agrees to meet the requirements for mitigation plans identified in 44 CFR §201.6 and to provide such cooperation as is necessary and in a timely manner to Bottineau County emergency management office to complete the plan in conformance with FEMA requirements.

[City of Kramer] understands that it must engage in the following planning process, as more fully described in FEMA's Local Multi-Hazard Mitigation Planning Guidance dated July 1, 2008, including, but not limited to:

- Identification of hazards unique to the jurisdiction/district and not addressed in the master planning document;
- The conduct of a vulnerability analysis and an identification of risks, where they differ from the general planning area;
- The formulation of mitigation goals responsive to public input and development of mitigation actions complementary to those goals. A range of actions must be identified specific for each jurisdiction/district ;
- Demonstration that there has been proactively offered an opportunity for participation in the planning process by all community stakeholders (examples of participation include relevant involvement in any planning process, attending meetings, contributing research, data, or other information, commenting on drafts of the plan, etc.); and
- Documentation of an effective process to maintain and implement the plan; and,
- Formal adoption of the Multi-Jurisdictional/Community Hazard Mitigation Plan by the jurisdiction's/communities governing body (each jurisdiction/community must officially adopt the plan).

Therefore, with a full understanding of the obligations incurred by participating in the FEMA hazard mitigation planning process as a participant in a multi-jurisdictional/district plan; I William Fecht commit (City of Willow City) to the Bottineau County Multi-jurisdictional/community Multi Hazard Mitigation Planning effort.

Executed this 15 day of SEPT



Appendix B, Planning Process

The Kick-Off Meeting was held on March 19, 2015. The Agenda, handouts, and Minutes of the meeting are included below.

Newspaper Article from the “Turtle Mountain Mirror”

Every five years the Counties in North Dakota are required to update their Multi Hazard Mitigation plans. This is the year for Bottineau County to update our plan.

The County has applied for and received a grant to assist with the updating of the plan. Wenck associates has been contracted to assist with the updating of the plan. Wenck is a company out of Minnesota with an office in Mandan.

I will need the assistance with the updating from several different entities within the County to help with the update from Law Enforcement, EMS, hospital, public works and of course County and City governments. The assistance I need is with your ideas on things that we might like to see mitigated within the county, something that would make the residence of the County and the cities safer.

The County and Cities need to be onboard with this planning process to qualify for FEMA funds that might come available because of a disaster.

Please, I am asking for your assistance in this planning process. The Kickoff meeting will be held in Bottineau on the 17th of March 2015 7:00pm in Bottineau. You will be notified of the location.

Again Thank You.

Rick Hummel

Bottineau County Emergency Manager

201-0715(cell), 228-5917(Office) 228-5025(Home)

Agenda, Bottineau County Multi-Hazard Mitigation Planning Kick-Off Meeting 7:00 PM March 17, 2015, Bottineau, ND

1. Welcome, Rick Hummel
2. Introductions
3. Project Funding for MHMP from grant money
4. Wenck's background with MHMP
5. Bottineau County Past Presidential Disaster Declarations
6. Explanation of Federal/State/Local mitigation cost share
7. Current plan expired November 2014
 - a. Submit draft plan to state
 - b. Submit to FEMA
8. Planning Team Obligations
 - a. Participate in 3-4 meetings
 - b. Answer questions
 - c. Validation plan updates
 - d. Mitigation strategy
9. Public Opinion Survey
10. Review of 2015 Multi-Hazard Mitigation Plan, Introduction and Sections 1, 2, 3
11. Next meeting
 - a. Preferred location?
 - b. Preferred day of week and time?
12. Does everyone in attendance agree to be on the planning committee?

Kickoff Meeting Minutes

March 19th, 2015

Multi-Hazard Mitigation Plan Kickoff Meeting (Bottineau, ND) @ Bottineau Armory

Rick Hummel, the Bottineau County Emergency Manager welcomed the meeting participants. He proceeded with introductions and explained how the planning process was being funded through the North Dakota

Department of Emergency Services Grant and local funding cost share. Mr. Hummel introduced Ken Jarolimek, the consultant from Wenck and Associates and asked him to proceed with the meeting.

Ken Jarolimek introduced the planning process and the plan approval process and how the planning process would be utilized to update the Multi-Hazard Mitigation Plan. Ken Jarolimek proceeded with the PowerPoint that is located below. It was decided by the Multi-Hazard Mitigation Planning Committee to meet on Wednesdays in Bottineau at the Armory. It was considered the best place to hold the meetings. A discussion for the next meeting was held and it was decided that the next meeting would be at 7:00 PM towards the end of April, the exact date to be determined by Mr. Hummel.

The consultant had prepared draft copies of Sections 1, 2, and 3. The committee was divided into groups and reviewed the draft copies and made corrections, deletions and additions to the drafts. The groups reported their findings to the entire committee who agreed with the findings and in some cases added to the report.

The Hazard Mitigation Questionnaire was handed and participants were asked to complete it and bring it back at the next meeting. The meeting adjourned about 8:30 PM.

Sign-In Sheet, Bottineau County Multi-Hazard Mitigation Planning

Kick-Off Meeting, Bottineau, ND, March 17, 2015

Name	Address	Phone Number	E-Mail	Representing	Position
Charlene Weistad	P.O. Box 111 Newburg ND 58762	359-4402	weistadcharlene@ymail.com	Kramer	Volunteer
Tyson Klusk	Box 125 W 85th Ave	263-5764	—	Wasthopp	Vol
Katie Sankally	P.O. Box 312 Bottineau	612-875-1085	ktsankal@bottineau.net	Bottineau EMS	Vol
Rob Peterson	385 4th St S Willow City	366-4369		Willow City Fire Dept	Vol
Taylor Allard	1540 28th St Willow City	201-0440		WCTD	Vol
Ben Hults	Wier Square Baker	201-0139	meyerben@baker.com	Baker Fire	Vol
Dennis Logness	714 7th St. E. Bottineau	228-9300	logness@usma.com	St Andrews Health	Maint.
Larry Hayes	Lake Michigan State Park	201-0667 263-4651	lahayes@nd.gov	Lake Michigan State Park	State Park Manager

Sign-In Sheet, Bottineau County Multi-Hazard Mitigation Planning

Kick-Off Meeting, Bottineau, ND, March 17, 2015

Name	Address	Phone Number	E-Mail	Representing	Position
Ken Stetten	347-105th ST. NW	243-2434	ken@stetten.com	myself.	retired.
Jeff Soland	1471 Hwy 43 Bottineau, ND	263-3189	jsoland@stet.com	Bottineau Rural Fire	Asst. Chief
Al Hanson	701 21st St NE Minto	425-5870	al.hanson@nd.gov	NOBEE	Reg. Coord.
Steve Watson	403 Bennett Blvd Bottineau	228-2740	stevewatson@co.bottineau.nd.us	BCSD	St. Org
Ludy Peterson	323 4th St NW New City	364-4369		WCRFD	Sec. Treas
Tracey Hall	415 Marshall Willow City	364-4749		WCRFD	Volunteer
Maynard Hill	" "	" "		" "	" "
Jared Nelson	819 5th St E Bottineau	701-331-0626	Jared.Nelson.1@ndsu.edu	NDSU Extension	County Agent

>>Kickoff Meeting PowerPoint

Bottineau County Hazard Mitigation Planning Kickoff Meeting

- Agenda
 1. Define Mitigation
 2. Why we are updating the current Hazard Mitigation Plan
 3. Define Planning area
 4. Review planning Process
 5. Bottineau County Hazard Mitigation Planning Survey
 6. Take initial action to form a planning team

Introductions

- Name
- Represent who?
- Title
- Experience with disasters, emergency management

Disaster 2000

ing and requires state and
e multi-hazard mitigation
eceiving FEMA mitigation

Emergency Management Activities

- Mitigation
- Prevention
- Protection
- Preparedness
- Response
- Recovery

Mitigation

- Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.

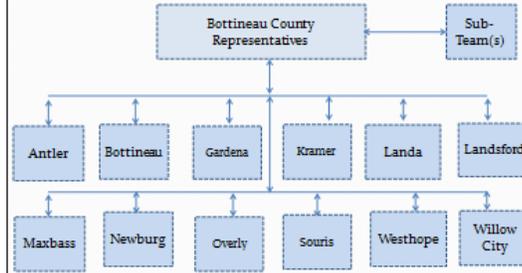
Plan

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lan
nt Community

Planning Area

- Bottineau County and the county's cities:
- [Antler](#)
- [Bottineau](#)
- [Gardena](#)
- [Kramer](#)
- [Landa](#)
- [Lansford](#)
- [Maxbass](#)
- [Newburg](#)
- [Overly](#)
- [Souris](#)
- [Westhope](#)
- [Willow City](#)

Bottineau County Planning Team



Partners Involved in Hazard Mitigation Activities

- Building Code Enforcement
- Emergency Management
- Fire Department/Districts
- Floodplain Administration
- Geographic Information Systems (GIS)
- Parks and Recreation
- Planning/Community Development
- Public Works
- State Emergency Management Office
- Regional Planning Agency

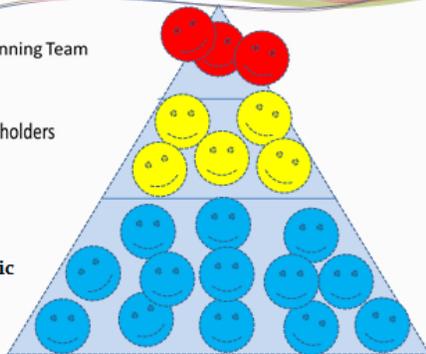
Partners with Authority to Regulate Development

- Board of County Commissioners
- City Councils
- Planning Commission
- Planning/Community Development
- Special Districts

Planning Team

Stakeholders

Public



Bottineau County Hazard Mitigation Public Opinion Survey

- Purpose is to document types of disasters that have affected citizens
- Gives the Planning team a planning base
- Improve public/private
 - Coordination
 - Mitigation
 - Risk reduction
- Ask questions if they arise.

Next Meeting

- Planning Meeting
- Daytime or Evening?
- Location?
- Schedule day of week that has minimum school and community activities.
 - Monday?
 - Tuesday?
 - Wednesday?
 - Thursday?

Bottineau County Hazard Mitigation Questionnaire

Completed by: _____

Agency/Jurisdiction: _____

Title: _____

Date: _____

1. What mitigation work has been done in your jurisdiction since 2010? (See question 10.)
2. Has your jurisdiction used the existing mitigation plan? If so, how? If not, what could be done to make the plan more useful?
3. What tools or regulations does your jurisdiction currently use to mitigate the risk to development? (building codes, zoning, etc.)
4. Has the mitigation plan or have hazard mitigation concepts been integrated into any other planning mechanisms, land use regulations, or documents (i.e. building codes, zoning, floodplain ordinances, master plans, subdivision regulations, etc.) since 2010?

5. The 2010 mitigation plan includes the following hazards:
- Communicable Disease
 - Dam Failure
 - Drought
 - Flood
 - Hazardous Materials Release
 - Homeland Security Incident
 - Shortage or Outage of Critical Materials or Infrastructure
 - Summer Storms
 - Transportation Accident
 - Urban Fire or Structure Collapse
 - Wildland/Rural Fire
 - Winter Weather

Would you like to see any other hazards added or changed?

6. How would you rank the hazards for your jurisdiction? Please rank in numerical order with 1 being the hazard of greatest concern and 12 being the hazard of lowest concern.

___ Communicable Disease (including human, animal, and plant diseases)

___ Dam Failure

___ Drought

___ Flood (including riverine, ice jam, and flash floods)

___ Hazardous Material Release

___ Homeland Security Incident

___ Shortage or Outage of Critical Materials or Infrastructure (including power outages and gas shortages)

___ Summer Storm (including tornadoes, hail, downbursts, lightning, and strong winds)

___ Transportation Accident (including vehicular, railway, and aircraft accidents)

___ Urban Fire or Structure Collapse

___ Wildland Fire

___ Winter Weather (including blizzards, heavy snow, ice storms, and extreme cold) any major disasters occurred in your jurisdiction since 2010? If so, what were the losses (type and dollar amount?)

7. What development/construction has occurred in your jurisdiction since 2010? Has any of this development occurred in a location or way that makes it more vulnerable to any of the identified hazards?

8. What mitigation goals do you have for your community? Goals are broad, visionary statements.

The state mitigation plan lists the following initiatives as possible local mitigation activities:

- *Mitigation Planning*
- *Basin-Wide Water Management Planning*
- *Data Digitization*
- *Impacts Database*
- *Hazardous Materials Field Study*
- *Transportation Database*
- *Wildland Fire Database*
- *Public Education*
- *Situational Awareness*
- *Insurance Education*
- *Building Codes*
- *Zoning and Ordinances*
- *Restrictive Covenants*
- *Bank Stabilization*
- *Flood Control*
- *Waffle® Flood Mitigation*
- *Property Acquisition, Relocation, and Elevation*
- *Storm Water Management and Roadway Protection*
- *Flood proofing*
- *Warning Systems*
- *Weather Spotter Training*
- *Tornado Safe Rooms and Shelters*
- *Window Safety Film*
- *Electric Infrastructure Protection*
- *Snow Fences*
- *Drought Water Management*
- *Drought Land and Crop Practices*
- *Water Supply Intakes*
- *Firewise Programs*
- *Firebreaks*
- *Emergency Haying and Grazing*
- *Household Hazardous Waste Regulations*
- *Security*
- *Back-up Power*
- *Smoke Detectors and Sprinkler Systems*

Which types of mitigation projects do you think would work best in your jurisdiction (list specific locations, if applicable)?

11. What other mitigation projects would you like to see done in your community?

Email Notice Advertising April 29, 2015 Multi-Hazard Planning Committee Meeting

From: Rick Hummel [mailto:Rick.Hummel@co.bottineau.nd.us]

Sent: Monday, April 06, 2015 9:39 AM

To: Boundarylake@gmail.com; Hagen, Larry A.; katie Saykally; North Central Electric Cooperative (nceci@nceci.com); Jason Kersten (Jason.Kersten@sendit.nodak.edu); Matthew Keith (matthew.keith@dakotacollege.edu); Dan Marquardt; Jeff Beyer; Lance Kjelshus; LeRoy Rude; Lisa Herbel; Todd Streich; allard; Darren; Eric Nostdahl; Jeff Soland; judyshuchard58@hotmail.com; Keith Martin; Maxbass fire; Nathaniel Buynak; R. Gimbel; Rick Mckay; Allan Hanson; Allen Kluth; dennis Lagasse ; Joan Mortenson; Jose' Estrada; Luann Soland; Rick Hummel; Steve Watson; Sue Brandvold; Jeff Beyer; Kelly Jensen; Lisa Herbel; Lisa Peterson; Sue Brandvold; Terry Volk; Tim Berry; Adam Beyer; adam Frkman; Anthony Lindquist; Brad Strulaugson; Chad Driscoll; Chris Dubois; Dav Vad; Dean Oakland; Eric Nostdahl; Jeff Soland; Jennifer Issendorf; Jon Beyer; Jonathan Tofteland; Louis Volk; Mark Klingbeil; Mark Pewe (mpewe52@ndca.net); paul Pasicznyk; Rick Hummel; Ryan Getzlaff; shar Lund; Steve Lorenz; swain Benson; Tammy Ovitt; Tim Fedje; Tim Kihle; Todd Kihle; troy Olson; Tyson Brandt; Ann Monson; Helen Christenson; Jeff Beyer; Karla Monson; Kelly Jensen; Lisa Peterson; Michael Sturdevant; Rhonda Langehaug; Rick Hummel; Steve Watson; Terry Volk; Barb Undlin; city of newburg; Deb Hoskins; Ken Loe; Kevin Naumann; Penny Nostdahl; Westhope; amanda Schooling; Andrea Cross; Barry Jager; Don Longmuier; Jerry Samuelson; Jody Gunlock; Karoline Rockvov; kristy Titus; Noelle Kroll; Rodney Onstott; S Bummer; S.England; Whitman (TAT)

Cc: Ken L. Jarolimek

Subject: planning meeting (mitigation)

This meeting is for all responders and public to attend, if you cannot attend please send someone to represent your agency.

Rick Hummel

Bottineau County Emergency Manager

Cell-701-201-0715

Office-701-228-5916

FaX-710-228-2364

Attachment to this email on 4-6-2015 (See BELOW)

Attention;

Every five years the Counties in North Dakota are required to update their Multi Hazard Mitigation plans.

This is the year for Bottineau County to update our plan.

The County has applied for and received a grant to assist with the updating of the plan. Wenck associates has been contracted to assist with the updating of the plan. Wenck is a company out of Minnesota with an office in Mandan.

I will need the assistance with the updating from several different entities within the County to help with the update. Law Enforcement, EMS, hospital, public works and of course County and City governments &etc. The assistance I need is with your ideas on things that we might like to see mitigated within the county, something that would make the residence of the County and the cities safer.

The County and Cities need to be onboard with this planning process to qualify for FEMA funds that might come available because of a disaster.

Please, I am asking for your assistance in this planning process. The second planning meeting will be held in Bottineau on the 29th of April 2015 7:00pm. The location of the meeting will be in the east room of the Bottineau Armory

Again Thank You.

Rick Hummel

Bottineau County Emergency Manager

201-0715(cell), 228-5917(Office) 228-5025(Home)

Minutes of April 29 Meeting

Rick Hummel, the Bottineau County Emergency Manager opened the meeting by welcoming everyone. Introductions and purpose of the meeting was completed. Mr. Hummel than introduced the Contractor, Ken Jarolimek from Wenck Associates to conduct the meeting. Mr. Jarolimek explained the updates to Sections 1-2-3 that were suggested at the previous meeting were made. Copies were given out to the emergency manager for his review and to distribute to selected committee members who have an interest in reviewing the draft sections.

Draft Sections 4.1 through 4.13 were handed out the meeting participants. They were instructed to break into small groups based on their knowledge and/or interest in a particular hazard. The committee members reviewed the draft copies and amended the draft copies by adding to, deleting, or changing the draft copy. The small groups reported to the entire planning committee who discussed the suggested changes which were for the most part accepted.

The consultant than announced the next meeting agenda will be to review the hazard mitigation projects from the old plan, determine their status, decide which projects to carry over into the new plan and identify new projects. The committee members were given copies of the old projects and a worksheet to list new projects.

It was decided to hold the next meeting on May 20, 2015 at the Bottineau Armory.

April 29 Meeting Roster

Sign-In Sheet, Bottineau County Multi-Hazard Mitigation Planning

Multi-Hazard Committee Meeting, Bottineau, ND, April 29, 2015

	Name	Address	Phone Number	E-Mail	Representing	Position
1	Katie Sakally	PO Box 372 Bottineau	612- 875-1085	hamburino@ hotmail.com	Bottineau Ambulance	Vice President
2	Sandy Engeland	P.O. Box 561 Towner 58786	701-240- 8415	sengeland@ nd.gov	Miskenny Co EM	
3	Noelke Krall	PO Box 535 Washburn, ND 58571	701-315- 0400	nkrall@ nd.gov	m c lean Co EM	EM
4	Tracey Haal	willow city	701-366- 4749		wild fire dept	Volunteer
5	Maynard Abel	" "	366- 4749		wild fire	Volunteer
6	Jose Estrada	4015 Hansen Dr. Minot	721-399	Jestrada@ nd.gov	FDHU	EPN
7	Jason Kersten	1240 10th St NE Bottineau	486-9488	jason.c.kersten@ kia.nd.us	Bottineau School	Supt.
8	Dennis Lagase	7147 1st East	728-2801	dennisl@urmq com	SF. Andrews Health Care	Mannt Safety
9	Al Hanson	1600 2nd Ave SW #4	425-6870	alhanson@ nd.gov	NODES	Reg. Coord.

Sign-In Sheet, Bottineau County Multi-Hazard Mitigation Planning

Multi-Hazard Committee Meeting, Bottineau, ND, April 29, 2015

	Name	Address	Phone Number	E-Mail	Representing	Position
10	Ken Stetten	347-105th St NW Souris	243-6434	ken@kendela.com		
11	Myron Probst	115 2nd Ave West	701-359-4320	NO NE	City oframer Kramer Fire Dept	Mayor
12	Gerald Auer	241 90th St NW Mckays NP	701-268-3257	ambassfire@att.com	Mckays Rural Fire	Fire Chief
13	Nathan Boyack	3459 6th St Storwood, ND	459-2822	nbayack@hotmail.com	Antho. Fire	Chief
14	Steve Walker	314 W 9th St W. Sunder Bellemead, ND	238-2740	Steve.Walker@waterworks.com	Water Works	Chief
15	Judy Peterson	325 4th St S Willow City	766-4369		WCRFD	Secretary
16	Rod Peterson					
17	Rick Gustafson	Bonno	863-5101	rickgust@waterworks.com	KBFO	PIO
18	DAN SCHAEFER	1066 Hayes NE Bottineau	228-3663	danschaefer@midconetwork.com	ALL SEASONS WATER USE DIST.	MANAGER

Sign-In Sheet, Bottineau County Multi-Hazard Mitigation Planning

Multi-Hazard Committee Meeting, Bottineau, ND, April 29, 2015

Name	Address	Phone Number	E-Mail	Representing	Position
19 Wassen Limes	22 Boundary Lane	263-3200	Boundaryland@gmail.com	Boundary	✓
20 Zach Bierhaus	445 Peacekeeper Pl Minot AFB	701-723-4819	Zachary.bierhaus.1@us.af.mil	Minot AFB	Emergency Mgmt Flight Commander
21 Rodney Onstott	523 Bomber Blvd MINOT AFB ND 58705	701-723-3133	rodney.onstott@us.af.mil	MINOT AFB	EMER. MANAGER

Public Notice Poster developed by Bottineau County Emergency Manager Rick Hummel around the County on May 11th, 2015 for May 20, 2015 Multi-Hazard Planning Committee Meeting.

PUBLIC NOTICE

Bottineau County
Emergency Management
Is holding a public meeting
Regarding the Multi Hazard
Mitigation Plan. This will be a
meeting for
Public input and comment.
All interested persons are
invited to attend.

The meeting will
Be held at the
Bottineau Armory
May 20th, 2015 7pm.
For further information
Please contact
Rick Hummel at 701-228-5916

Minutes of the May 20, 2015 Multi-Hazard Committee Meeting

The meeting began by the Bottineau County Emergency Manager Rick Hummel reviewing the purpose of the meeting. He stated the purpose was to review the current mitigation projects listed in the existing plan and develop new projects that will improve the county. He then turned the meeting over to Ken Jarolimek, the Wenck Associates consultant.

Ken Jarolimek handed out the copies of the existing projects. The committee reviewed them and in a discussion it was determined the status of each project whether it was completed, deleted, to be a carryover project into the new plan or a project that is on-going or underway.

The committee was than broken into community groups to discuss new projects that could be placed into the plan. When they were completed they reported to the entire committee which prompted project discussion. One project that came out of the county group was drainage from the county area north of Bottineau into the City of Bottineau causing flooding especially into the hospital. Much discussion centered on this situation and it was determined that it be a top priority project. First to study the drainage, determine how the water can be safely diverted, and thirdly carry out the project.

The community groups turned in their notes and the meeting adjourned.

Roster for May 20 Multi-Hazard Committee Meeting

Sign-In Sheet, Bottineau County Multi-Hazard Mitigation Planning Multi-Hazard Committee Meeting, Bottineau, ND, May 20, 2015

Name	Address	Phone Number	E-Mail	Representing	Position
Gerald Austin	2141 90th ST NW	701 249 3857	Markkristine@SRA.com	Markkristine Fire Dis	Fire Chief
Wabson, Stene	504 Kennedy Dr	701-235-3744	Stene@Wabson@aol.com	Bott Co Sheriff's Dept	Sherriff
Scott Bierman	PO Box 522 Newburg	373-6358	citynewburg@hotmail.com	Newburg	Facilitator
Jeff Soland	1471 Hwy 43 Bottineau, ND	701-263-3189	jsoland@sra.com	Bottineau Rural Bottineau Fire	Asst Chief
Ken Stetten	347-105th St NW, Souris	701-243-6434	ken@stetten.com	myself	—
Rick Costello	1050 4th N W9	701-263-5701	rcostello@chm.com	PIC	PIC
DAVE CAROLINE	606 UERT BOND	701-228-2202	dcaroline@necwi.com	ALBERTA BENTON BERRA COOP.	LIVE SUPP.
Shane Parsons	212 Ohmer Bottino	701-721-4021	dylanohmer@hotmail.com	KBTB	
Nike Monstern	Bottino	721-0782		LM Mirror	
Dennis Lagasse	Bottino	235-2861	lagasse@vtm.com	St Andrews	Safety

**Sign-In Sheet, Bottineau County Multi-Hazard Mitigation Planning
Multi-Hazard Committee Meeting, Bottineau, ND, May 20, 2015**

Name	Address	Phone Number	E-Mail	Representing	Position
Katie Soudally	Po Box 372 Bottineau	612-875-1085	kambour@nd.gov	Bottineau	Vice President
Amy Sand	117 West 5th St Bottineau	228-3611 ext 3	amy@soudally.com	MRS	District Conservationist
Nathaniel Bernack	3459 Co Rd 2 Seymour	489-2822	nbernack@nd.gov	A.H.W. Fire	Chief
Scott Meyer	Po Box 39 Bottineau, ND	385-2005	scottmeyer@nd.gov	Bottineau	Chair

Newspaper Article published in the “Turtle Mountain Mirror”

In order to keep qualifying for federal funding, Bottineau County held its third and final Hazardous Mitigation Meeting last Wednesday to put finishing touches on a federally mandated five-year plan drafted by Wenck Response Associates.

The meeting opened with Wenck representative Ken Jarolimek going through a list of potential suggestions to be included in the plan and the status of those plans. The status criteria included, ongoing, completed and/or deleted. Projects still in planning stages or waiting for funding to be completed were listed as ongoing while the completed or deleted stamp is self-evident. The suggestions included specific issues like the purchase of new equipment, ongoing training for certain emergencies, notification to the public or a specific group of a project or plans on how to move forward with specific issues such as flood mitigation and other problems. Bottineau County Emergency Services Director Rick Hummel said that many of the suggestions in the plan are ongoing because funding is not available. Hummel said his office has applied for numerous grants, which are very competitive between all the cities statewide. Hummel also said the current Hazardous Mitigation Plan was scheduled to expire in May, prompting the action.

“The money awarded is very competitive between the state’s counties and is awarded on a cost-benefit analysis,” Jarolimek said. “The purpose of Hazard Mitigation is to reduce or eliminate losses to human life and property resulting from natural hazards and manmade threats. There have been a lot of studies done to help reduce mitigation costs and we’ve learned from the past problems.

“For example, in 2011, there was more water that passed through Grand Forks than during the big flood in 1997 and the hazard was greatly reduced because of those studies in place. We are nearly done with the final plan that will include a list of projects, the hazard vulnerability of the projects and the actual hazard mitigation suggestions. The projects with highest cost-benefit analysis are going to get the money.”

Representatives from many communities within the county were present to address the specific needs and status of those areas. Antler, Bottineau County, Westhope, Newburg, the City of Bottineau and other entities (hospital-clinic, school districts, fire districts and water boards) dealing with hazard mitigation were on hand to offer suggestions for the final plan.

- Mike Manston

Appendix C ACRONYMS & GLOSSARY

AHPS	Advanced Hydrologic Prediction Service
ALF	Animal Liberation Front
BLM	Bureau of Land Management
BFE	Base Flood Elevation
BNSF	Burlington Northern Santa Fe
BSE	Bovine Spongiform Encephalopathy
CAP	Community Assistance Program
CBRNE	Chemical Biological Radiological Nuclear Explosive
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
CRP	Conservation Reserve Program
CRREL	Cold Regions Research and Engineering Laboratory
CRS	Community Rating System
DCS	Division of Community Services
DES	Department of Emergency Services
DFIRM	Digital Flood Insurance Rate Map
DHS	Department of Homeland Security
DMA	Disaster Mitigation Act of 2000
DNRC	Department of Natural Resources and Conservation
DOI	Department of Interior
DOJ	Department of Justice
DOT	Department of Transportation
DR	Disaster

EDA	Economic Development Administration
EO	Executive Order
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
ELF	Earth Liberation Front
EM	Emergency
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FALN	Armed Forces of National Liberation (translated)
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
FWS	Fish & Wildlife Service
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
HAZUS-MH	Hazards United States Multi-Hazard
HMEP	Hazardous Materials Emergency Program
HMGP	Hazard Mitigation Grant Program
HUD	Housing and Urban Development

HVAC	Heating, Ventilating, and Air Conditioning
IA	Individual Assistance
IHMT	Interagency Hazard Mitigation Team
LEPC	Local Emergency Planning Committee
LP	Liquefied Petroleum
MHMP	Multi-Hazard Mitigation Plan
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
NCDC	National Climatic Data Center
ND	North Dakota
NDCC	North Dakota Century Code
NDDES	North Dakota Department of Emergency Services
NFIP	National Flood Insurance Program
NFP	National Fire Plan
NID	National Inventory of Dams
NIFC	National Interagency Fire Center
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NTSB	National Transportation & Safety Board
NWS	National Weather Service
OMB	Office of Management and Budget
PA	Public Assistance
PCB	Polychlorinated Biphenyl
PDM	Pre-Disaster Mitigation
PDSI	Palmer Drought Severity Index

PL	Public Law
RFA	Rural Fire Assistance
RFC	Repetitive Flood Claims
SARA	Superfund Amendment Reauthorization Act
SARS	Severe Acute Respiratory Syndrome
SBA	Small Business Administration
SFA	State Fire Assistance
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SHMT	State Hazard Mitigation Team
SRL	Severe Repetitive Loss
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, Environmental
SWAT	Special Weapons and Tactics
SWC	State Water Commission
UND	University of North Dakota
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFA	United States Fire Administration
USFS	United States Forest Service
USGS	United States Geological Survey
WMD	Weapons of Mass Destruction
WPDG	Wetland Program Development Grants
WRD	Water Resource District
WUI	Wildland Urban Interface

Applicant - State agency, local government, or any political subdivision of the State, including Indian tribes and Alaskan native villages, that applies for FEMA post-disaster assistance. Also, private nonprofit organizations that include medical, emergency (fire and rescue), utility, educational, custodial care, zoos, community centers, libraries, homeless shelters, senior citizens centers, and sheltered workshops.

Community Rating System (CRS) - An NFIP program that provides incentives for NFIP communities to complete activities that reduce flood hazard risk. The insurance premiums of these communities are reduced when the community completes specified activities.

Declaration - Presidential finding that a jurisdiction of the United States may receive Federal aid as a result of damages from a major disaster or emergency.

Department of Homeland Security (DHS) – A cabinet-level department established in 2002 by merging 22 separate agencies into a cohesive department with a primary mission of protecting the homeland.

Disaster Mitigation Act 2000 (DMA 2000) - Amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act). The purpose of DMA 2000 is to reduce loss of life and property, human suffering, economic disruption, and disaster assistance costs.

Disaster-Resistant Communities Initiative - A community-based initiative that seeks to reduce vulnerability to natural hazards for the entire designated area through hazard mitigation actions. This approach requires cooperation between individuals and the business sectors of a community to implement effective hazard mitigation strategies.

Emergency - Any hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, drought, fire, explosion, or other catastrophe in any part of the United States that requires Federal emergency assistance to supplement State and local efforts to save lives and protect property, public health, and safety, or to avert or lessen the threat of a disaster. Defined in Title V of Public Law 93-288, Section 102(1).

Existing Construction - As used in reference to the NFIP, any structure already existing or on which construction or substantial improvement was started prior to the effective date of a community's floodplain management regulations.

Federal Emergency Management Agency (FEMA) - The lead Federal agency with responsibility for responding to Presidential emergencies and major disasters. FEMA's mission is to reduce loss of life and property and protect our Nation's critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of hazard mitigation, preparedness, response, and recovery.

Flood Insurance Rate Maps (FIRMS) - The official map of a community prepared by FEMA, showing base flood elevations along with the special hazard areas and the risk premium zones.

Flood Mitigation Assistance Program (FMA) - Provides pre-disaster grants to State and local governments for both planning and implementation of hazard mitigation strategies. Each State is awarded a minimum level of funding that may be increased depending upon the number of NFIP policies in force and repetitive claims paid. Grant funds are made available from NFIP insurance premiums, and therefore are only available to communities participating in the NFIP.

Hazard Mitigation - Sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects.

Hazard Mitigation Grant Program (HMGP) - Authorized under Section 404 of the Stafford Act; provides funding for cost-effective hazard mitigation projects in conformance with the post-disaster hazard mitigation plan required under Section 409 of the Stafford Act.

Hazard Mitigation Plan - The plan resulting from a systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards present in society that includes the actions needed to minimize future vulnerability to hazards.

Hazard Mitigation Planning Team - A local hazard mitigation planning team composed of government and private-sector individuals with a variety of skills and areas of expertise, usually appointed by the city or town manager, or chief elected official. The group uses these skills to find solutions to community hazard mitigation needs and gain community acceptance of those plans.

Human Services - Supplementary Federal assistance provided under the Stafford Act to individuals and families adversely affected by a major disaster or emergency. Also known as Individual Assistance, Temporary Housing Assistance, Unemployment Assistance, and Individual and Family grants.

Infrastructure Support - Federal financial assistance provided under the Stafford Act to State and local governments or to eligible private nonprofit organizations for disaster-related requirements. Also known as Public Assistance (PA).

Major Disaster - Any hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, drought, fire, explosion, or other catastrophe in any part of the United States that, in the determination of the President, causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act, above and beyond emergency services by the Federal Government, to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby defined under Public Law 93-288.

Mitigation Assessment Team (MAT) Program - works to increase damage resistance through improvements in construction codes and standards, designs, methods, and materials used for new construction and post-disaster repair and recovery.

National Flood Insurance Program (NFIP) - Provides the availability of flood insurance in exchange for the adoption and enforcement of a minimum local floodplain management ordinance. The ordinance regulates new and substantially damaged or improved development in identified flood hazard areas.

Flood Mitigation Assistance Program (FMA) - Provides pre-disaster grants to State and local governments for both planning and implementation of hazard mitigation strategies. Each State is

Pre-Disaster Mitigation (PDM) – created by the Disaster Mitigation Act of 2000 (DMA 2000) includes competitive grants for hazard mitigation planning and projects.

Preparedness - Activities to ensure that people are ready for a disaster and respond to it effectively. Preparedness requires figuring out what will be done if essential services break down, developing a plan for contingencies, and practicing the plan.

Recovery - Activities necessary to rebuild after a disaster. Recovery activities include rebuilding homes, businesses, and public facilities; clearing debris; repairing roads and bridges; and restoring water, sewer, and other essential services.

Response - Activities to address the immediate and short-term effects of an emergency or disaster. Response activities include immediate actions to save lives, protect property, and meet basic human needs.

Section 404 of the Stafford Act - Authorizes the Hazard Mitigation Grant Program, which provides funding for cost-effective hazard mitigation measures.

Section 409 Hazard Mitigation Plan - Requires the identification and evaluation of mitigation opportunities, and that all repairs be made to applicable codes and standards, as a condition for receiving Federal disaster assistance. Enacted to encourage identification and mitigation of hazards at all levels of government.

Stafford Act - Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707, signed into law November 23, 1988; amended the Disaster Relief Act of 1974, PL 93-288. The statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and FEMA programs.

STAPLE(E) - An acronym for the criteria that can be used by a community in selecting an appropriate mitigation strategy: Social, Technical, Administrative, Political, Legal, and Economic/Environmental.

State Hazard Mitigation Officer (SHMO) - The representative of State government who is the primary point of contact with FEMA, other State and Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.

ID Number	Parent Co Name	Chemical Name	EHS
8479	Enduro Operating LLC	Produced Hydrocarbons	
8480	Enduro Operating LLC	Produced Hydrocarbons	
8481	Enduro Operating LLC	Produced Hydrocarbons	
8482	Enduro Operating LLC	Produced Hydrocarbons	
8483	Enduro Operating LLC	Produced Hydrocarbons	
8484	Enduro Operating LLC	Produced Hydrocarbons	
2405	Murex Petroleum Corporation	Crude Oil	
2414	Murex Petroleum Corporation	Crude Oil	
2414	Murex Petroleum Corporation	Propane	
2418	Murex Petroleum Corporation	Crude Oil	
2442	Murex Petroleum Corporation	Crude Oil	
2442	Murex Petroleum Corporation	Propane	
2454	Murex Petroleum Corporation	Crude Oil	
2454	Murex Petroleum Corporation	Propane	
2523	Murex Petroleum Corporation	Crude Oil	
2547	Murex Petroleum Corporation	Crude Oil	
2547	Murex Petroleum Corporation	Propane	
2555	Murex Petroleum Corporation	Crude Oil	
2555	Murex Petroleum Corporation	Propane	
2556	Murex Petroleum Corporation	Crude Oil	
2569	Murex Petroleum Corporation	Crude Oil	
2572	Murex Petroleum Corporation	Crude Oil	
2578	Murex Petroleum Corporation	Crude Oil	
2579	Murex Petroleum Corporation	Crude Oil	
2586	Murex Petroleum Corporation	Crude Oil	
2613	Murex Petroleum Corporation	Crude Oil	
2613	Murex Petroleum Corporation	Propane	
2633	Murex Petroleum Corporation	Crude Oil	
2654	Murex Petroleum Corporation	Crude Oil	
2669	Murex Petroleum Corporation	Crude Oil	
2673	Murex Petroleum Corporation	Crude Oil	
2686	Murex Petroleum Corporation	Crude Oil	
2689	Murex Petroleum Corporation	Crude Oil	
2697	Murex Petroleum Corporation	Crude Oil	
2737	Murex Petroleum Corporation	Crude Oil	
2756	Murex Petroleum Corporation	Crude Oil	
2009	Ferrellgas - Bismarck Service Center	Propane	
12807	Dakota Agronomy Partners	Urea	
12807	Dakota Agronomy Partners	MESZ	
12818	Dakota Agronomy Partners	Ammonia	X
12828	Dakota Agronomy Partners	widematch	
12828	Dakota Agronomy Partners	RT3	
12828	Dakota Agronomy Partners	Gromoxone Inteon	X
12828	Dakota Agronomy Partners	LIBERTY Glufosinate	
12828	Dakota Agronomy Partners	Cornerstone Plus 5	

12828	Dakota Agronomy Partners	monoammonium phosphate	
12828	Dakota Agronomy Partners	Urea	
12828	Dakota Agronomy Partners	2,4-D Amine 4	
12829	Dakota Agronomy Partners	Ammonia	X
12830	Dakota Agronomy Partners	Ammonia	X
12831	Dakota Agronomy Partners	widematch	
12831	Dakota Agronomy Partners	RT3	
12831	Dakota Agronomy Partners	Gromoxone Inteon	X
12831	Dakota Agronomy Partners	LIBERTY Glufosinate	
12831	Dakota Agronomy Partners	Cornerstone Plus 5	
12831	Dakota Agronomy Partners	2,4-D Amine 4	
12831	Dakota Agronomy Partners	28-0-0	
12832	Dakota Agronomy Partners	Ammonia	X
12835	Dakota Agronomy Partners	widematch	
12835	Dakota Agronomy Partners	RT3	
12835	Dakota Agronomy Partners	Gromoxone Inteon	X
12835	Dakota Agronomy Partners	LIBERTY Glufosinate	
12835	Dakota Agronomy Partners	Cornerstone Plus 5	
12835	Dakota Agronomy Partners	2,4-D Amine 4	
12837	Dakota Agronomy Partners	Urea	
12837	Dakota Agronomy Partners	monoammonium phosphate	
12837	Dakota Agronomy Partners	28-0-0	
12838	Dakota Agronomy Partners	Ammonia	X
5885	Wal-Mart Stores, Inc.	Propane	
4292	Bottineau Municipal Airport Authority	100LL- Aviation Gasoline	
2404	Ballantyne Oil	Crude Oil	
2417	Ballantyne Oil	Crude Oil	
2422	Ballantyne Oil	Crude Oil	
5051	Ballantyne Oil	Crude Oil	
6557	Ballantyne Oil	Crude Oil	
1502	Turtle Mountain Communications	Sulfuric Acid	X
1514	Turtle Mountain Communications	Sulfuric Acid	X
1516	Turtle Mountain Communications	Sulfuric Acid	X
1518	Turtle Mountain Communications	Sulfuric Acid	X
3707	Berenergy Corporation	Crude Oil	
3709	Berenergy Corporation	Crude Oil	
3710	Berenergy Corporation	Crude Oil	

2921	Souris River Cooperative	Gasoline	
2921	Souris River Cooperative	Motor Oil	
2921	Souris River Cooperative	Diesel Fuel	
1125	Farmers Union Oil Company-Willow City	Propane	
1125	Farmers Union Oil Company-Willow City	Gasoline	
1125	Farmers Union Oil Company-Willow City	Diesel Fuel	
1125	Farmers Union Oil Company-Willow City	Ammonia	X
1153	Farmers Union Oil Company-Willow City	Motor Oil	
1153	Farmers Union Oil Company-Willow City	Glyphosate	
3214	Plains Marketing	Crude Oil	
3586	RIM Operating, Inc.	Crude Oil	
3586	RIM Operating, Inc.	Methanol	
5160	RIM Operating, Inc.	Crude Oil	
5160	RIM Operating, Inc.	Methanol	
6611	RIM Operating, Inc.	Crude Oil	
8450	RIM Operating, Inc.	Crude Oil	
8450	RIM Operating, Inc.	Xylene	
8450	RIM Operating, Inc.	Methanol	
8451	RIM Operating, Inc.	Crude Oil	
8451	RIM Operating, Inc.	Methanol	
8451	RIM Operating, Inc.	Xylene	
10004	Petro Harvester Operating Company	Crude Oil	
10009	Petro Harvester Operating Company	Crude Oil	
10049	Petro Harvester Operating Company	Crude Oil	
10064	Petro Harvester Operating Company	Crude Oil	
10068	Petro Harvester Operating Company	Crude Oil	
10069	Petro Harvester Operating Company	Crude Oil	
10070	Petro Harvester Operating Company	Crude Oil	
10071	Petro Harvester Operating Company	Crude Oil	
10072	Petro Harvester Operating Company	Crude Oil	
10087	Petro Harvester Operating Company	Crude Oil	
10094	Petro Harvester Operating Company	Crude Oil	
10095	Petro Harvester Operating Company	Crude Oil	
10096	Petro Harvester Operating Company	Crude Oil	
10097	Petro Harvester Operating Company	Crude Oil	
10098	Petro Harvester Operating Company	Crude Oil	
10099	Petro Harvester Operating Company	Crude Oil	
10103	Petro Harvester Operating Company	Crude Oil	
10166	Petro Harvester Operating Company	Crude Oil	
10168	Petro Harvester Operating Company	Crude Oil	

10172	Petro Harvester Operating Company	Crude Oil	
10180	Petro Harvester Operating Company	Crude Oil	
10183	Petro Harvester Operating Company	Crude Oil	
10185	Petro Harvester Operating Company	Crude Oil	
4773	Hefty Seed	DURANGO DMA	
4773	Hefty Seed	Lo-Vol 6 (Tenkoz)	
4773	Hefty Seed	Roundup PowerMax	
4773	Hefty Seed	Prosaro 4215C	
12119	U S Customs and Border Protection	Propane	
12137	U S Customs and Border Protection	Propane	
11891	EnergyQuest II, LLC	Crude Oil	
11892	EnergyQuest II, LLC	Crude Oil	
11893	EnergyQuest II, LLC	Crude Oil	
11894	EnergyQuest II, LLC	Crude Oil	
11895	EnergyQuest II, LLC	Crude Oil	
11896	EnergyQuest II, LLC	Crude Oil	
11897	EnergyQuest II, LLC	Crude Oil	
11898	EnergyQuest II, LLC	Crude Oil	
11899	EnergyQuest II, LLC	Crude Oil	
11900	EnergyQuest II, LLC	Crude Oil	
11901	EnergyQuest II, LLC	Crude Oil	
11902	EnergyQuest II, LLC	Crude Oil	
11903	EnergyQuest II, LLC	Crude Oil	
11904	EnergyQuest II, LLC	Crude Oil	
11905	EnergyQuest II, LLC	Crude Oil	
11906	EnergyQuest II, LLC	Crude Oil	
11907	EnergyQuest II, LLC	Crude Oil	
11908	EnergyQuest II, LLC	Crude Oil	
11909	EnergyQuest II, LLC	Crude Oil	
11910	EnergyQuest II, LLC	Crude Oil	
11911	EnergyQuest II, LLC	Crude Oil	
11912	EnergyQuest II, LLC	Crude Oil	
11913	EnergyQuest II, LLC	Crude Oil	
11914	EnergyQuest II, LLC	Crude Oil	
11915	EnergyQuest II, LLC	Crude Oil	
11916	EnergyQuest II, LLC	Crude Oil	
11918	EnergyQuest II, LLC	Crude Oil	
11919	EnergyQuest II, LLC	Crude Oil	
11920	EnergyQuest II, LLC	Crude Oil	
11921	EnergyQuest II, LLC	Crude Oil	
11922	EnergyQuest II, LLC	Crude Oil	
11923	EnergyQuest II, LLC	Crude Oil	
11924	EnergyQuest II, LLC	Crude Oil	
11925	EnergyQuest II, LLC	Crude Oil	
7400	Citation Oil & Gas Corporation	Crude Oil	
7458	Citation Oil & Gas Corporation	Crude Oil	

7459	Citation Oil & Gas Corporation	Crude Oil	
7460	Citation Oil & Gas Corporation	Crude Oil	
7491	Citation Oil & Gas Corporation	Crude Oil	
7493	Citation Oil & Gas Corporation	Crude Oil	
7494	Citation Oil & Gas Corporation	Crude Oil	
7495	Citation Oil & Gas Corporation	Crude Oil	
7499	Citation Oil & Gas Corporation	Crude Oil	
7503	Citation Oil & Gas Corporation	Crude Oil	
7521	Citation Oil & Gas Corporation	Crude Oil	
7554	Citation Oil & Gas Corporation	Crude Oil	
11121	Citation Oil & Gas Corporation	Crude Oil	
11143	Citation Oil & Gas Corporation	Crude Oil	
11145	Citation Oil & Gas Corporation	Crude Oil	
11145	Citation Oil & Gas Corporation	Crude Oil	
11201	Citation Oil & Gas Corporation	Crude Oil	
13120	SRT Communications, Inc.	Sulfuric Acid	X
613	SRT Communications, Inc.	Sulfuric Acid	X
616	SRT Communications, Inc.	Sulfuric Acid	X
617	SRT Communications, Inc.	Sulfuric Acid	X
619	SRT Communications, Inc.	Sulfuric Acid	X
637	SRT Communications, Inc.	Sulfuric Acid	X
650	SRT Communications, Inc.	Sulfuric Acid	X
651	SRT Communications, Inc.	Sulfuric Acid	X
3438	North Dakota Department of Transportation	Tar Oil	
588	FUO WESTHOPE	Ammonia	
588	FUO WESTHOPE	Fuel Oil	
588	FUO WESTHOPE	Propane	
588	FUO WESTHOPE	Gasoline	
590	FUO WESTHOPE	Motor Oil	
591	FUO SOURIS	Motor Oil	
592	FUO SOURIS	Diesel Fuel	
592	FUO SOURIS	Gasoline	
592	FUO SOURIS	Diesel Fuel	
592	FUO SOURIS	Gasoline	
593	FUO BOTTINEAU	Propane	
594	FUO BOTTINEAU	Motor Oil	
2749	Denbury Onshore, LLC	Crude Oil	
3094	Denbury Onshore, LLC	Crude Oil	
3095	Denbury Onshore, LLC	Crude Oil	
3110	Denbury Onshore, LLC	Crude Oil	
4177	Denbury Onshore, LLC	Crude Oil	
4179	Denbury Onshore, LLC	Crude Oil	

4180	Denbury Onshore, LLC	Crude Oil	
4181	Denbury Onshore, LLC	Crude Oil	
4182	Denbury Onshore, LLC	Crude Oil	
4183	Denbury Onshore, LLC	Crude Oil	
4184	Denbury Onshore, LLC	Crude Oil	
4186	Denbury Onshore, LLC	Crude Oil	
4187	Denbury Onshore, LLC	Crude Oil	
4188	Denbury Onshore, LLC	Crude Oil	
4190	Denbury Onshore, LLC	Crude Oil	
4191	Denbury Onshore, LLC	Crude Oil	
4194	Denbury Onshore, LLC	Crude Oil	
4195	Denbury Onshore, LLC	Crude Oil	
4196	Denbury Onshore, LLC	Crude Oil	
4198	Denbury Onshore, LLC	Crude Oil	
4199	Denbury Onshore, LLC	Crude Oil	
4282	Denbury Onshore, LLC	Crude Oil	
11985	Denbury Onshore, LLC	Crude Oil	
12024	Denbury Onshore, LLC	Crude Oil	
12060	Denbury Onshore, LLC	Crude Oil	
13607	Bottineau Farmers Elevator	Gasoline	
13607	Bottineau Farmers Elevator	Diesel Fuel	
851	Central Power Electric Coop	Transformer oil	
993	Central Power Electric Coop	Transformer oil	
993	Central Power Electric Coop	Battery Acid	X
997	North Central Electric Coop	Transformer oil	
999	North Central Electric Coop	Transformer oil	
1006	North Central Electric Coop	Transformer oil	
1007	North Central Electric Coop	Transformer oil	
1011	North Central Electric Coop	Transformer oil	
1015	North Central Electric Coop	Transformer oil	
1017	North Central Electric Coop	Transformer oil	
1018	North Central Electric Coop	Transformer oil	
8534	Enduro Operating LLC	Produced Hydrocarbons	
8535	Enduro Operating LLC	Produced Hydrocarbons	
8536	Enduro Operating LLC	Produced Hydrocarbons	
8537	Enduro Operating LLC	Produced Hydrocarbons	
8538	Enduro Operating LLC	Produced Hydrocarbons	
8539	Enduro Operating LLC	Produced Hydrocarbons	
8540	Enduro Operating LLC	Produced Hydrocarbons	
8573	Enduro Operating LLC	Produced Hydrocarbons	
8574	Enduro Operating LLC	Produced Hydrocarbons	
8575	Enduro Operating LLC	Produced Hydrocarbons	
8576	Enduro Operating LLC	Produced Hydrocarbons	
8577	Enduro Operating LLC	Produced Hydrocarbons	

8578	Enduro Operating LLC	Produced Hydrocarbons	
8579	Enduro Operating LLC	Produced Hydrocarbons	
8580	Enduro Operating LLC	Produced Hydrocarbons	
8581	Enduro Operating LLC	Produced Hydrocarbons	
8582	Enduro Operating LLC	Produced Hydrocarbons	
8583	Enduro Operating LLC	Produced Hydrocarbons	
8584	Enduro Operating LLC	Produced Hydrocarbons	
8585	Enduro Operating LLC	Produced Hydrocarbons	
8730	Enduro Operating LLC	Produced Hydrocarbons	
8846	Enduro Operating LLC	Produced Hydrocarbons	
8847	Enduro Operating LLC	Produced Hydrocarbons	
8848	Enduro Operating LLC	Produced Hydrocarbons	
8849	Enduro Operating LLC	Produced Hydrocarbons	
8850	Enduro Operating LLC	Produced Hydrocarbons	
8851	Enduro Operating LLC	Produced Hydrocarbons	
8852	Enduro Operating LLC	Produced Hydrocarbons	
8853	Enduro Operating LLC	Produced Hydrocarbons	
8854	Enduro Operating LLC	Produced Hydrocarbons	
8855	Enduro Operating LLC	Produced Hydrocarbons	
8856	Enduro Operating LLC	Produced Hydrocarbons	
8862	Enduro Operating LLC	Produced Hydrocarbons	
8863	Enduro Operating LLC	Produced Hydrocarbons	
8864	Enduro Operating LLC	Produced Hydrocarbons	
8865	Enduro Operating LLC	Produced Hydrocarbons	
8866	Enduro Operating LLC	Produced Hydrocarbons	
1020	North Central Electric Coop	Transformer oil	
4600	Central Power Electric Coop	Transformer oil	
4600	Central Power Electric Coop	Battery Acid	X
5679	North Central Electric Coop	Transformer oil	
13602	Bottineau Farmers Elevator	Ammonia	X
13603	Bottineau Farmers Elevator	2,4-D Amine 4	
13604	Bottineau Farmers Elevator	2,4-D Amine 4	
13605	Bottineau Farmers Elevator	2,4-D Amine 4	
13606	Bottineau Farmers Elevator	Ammonia	X
4434	Eagle Operating, Inc.	Produced Hydrocarbons	
4434-1	Eagle Operating, Inc.	Produced Hydrocarbons	
4435	Eagle Operating, Inc.	Produced Hydrocarbons	
5516	Eagle Operating, Inc.	Produced Hydrocarbons	
10756	Continental Resources, Inc.	Crude Oil	
10757	Continental Resources, Inc.	Crude Oil	
11274	HRC Operating, LLC.	Crude Oil	
11275	HRC Operating, LLC.	Crude Oil	
11277	HRC Operating, LLC.	Crude Oil	

11278	HRC Operating, LLC.	Crude Oil	
11279	HRC Operating, LLC.	Crude Oil	
11280	HRC Operating, LLC.	Crude Oil	
11365	HRC Operating, LLC.	Crude Oil	
11366	HRC Operating, LLC.	Crude Oil	
11367	HRC Operating, LLC.	Crude Oil	
11370	HRC Operating, LLC.	Crude Oil	
11371	HRC Operating, LLC.	Crude Oil	
11372	HRC Operating, LLC.	Crude Oil	
11373	HRC Operating, LLC.	Crude Oil	
11374	HRC Operating, LLC.	Crude Oil	
11375	HRC Operating, LLC.	Crude Oil	
11377	HRC Operating, LLC.	Crude Oil	
11378	HRC Operating, LLC.	Crude Oil	
11379	HRC Operating, LLC.	Crude Oil	
11380	HRC Operating, LLC.	Crude Oil	
11384	HRC Operating, LLC.	Crude Oil	
8485	Enduro Operating LLC	Produced Hydrocarbons	
8486	Enduro Operating LLC	Produced Hydrocarbons	
8487	Enduro Operating LLC	Produced Hydrocarbons	
8488	Enduro Operating LLC	Produced Hydrocarbons	
8489	Enduro Operating LLC	Produced Hydrocarbons	
8491	Enduro Operating LLC	Produced Hydrocarbons	
8493	Enduro Operating LLC	Produced Hydrocarbons	
8494	Enduro Operating LLC	Produced Hydrocarbons	
8495	Enduro Operating LLC	Produced Hydrocarbons	
8496	Enduro Operating LLC	Produced Hydrocarbons	
8497	Enduro Operating LLC	Produced Hydrocarbons	
8498	Enduro Operating LLC	Produced Hydrocarbons	
8499	Enduro Operating LLC	Produced Hydrocarbons	
8500	Enduro Operating LLC	Produced Hydrocarbons	
8501	Enduro Operating LLC	Produced Hydrocarbons	
8505	Enduro Operating LLC	Produced Hydrocarbons	
8506	Enduro Operating LLC	Produced Hydrocarbons	
8507	Enduro Operating LLC	Produced Hydrocarbons	
8508	Enduro Operating LLC	Produced Hydrocarbons	
8509	Enduro Operating LLC	Produced Hydrocarbons	
8510	Enduro Operating LLC	Produced Hydrocarbons	
8511	Enduro Operating LLC	Produced Hydrocarbons	
8512	Enduro Operating LLC	Produced Hydrocarbons	
8513	Enduro Operating LLC	Produced Hydrocarbons	
8514	Enduro Operating LLC	Produced Hydrocarbons	
8516	Enduro Operating LLC	Produced Hydrocarbons	
8517	Enduro Operating LLC	Produced Hydrocarbons	
8518	Enduro Operating LLC	Produced Hydrocarbons	

8519	Enduro Operating LLC	Produced Hydrocarbons	
8520	Enduro Operating LLC	Produced Hydrocarbons	
8521	Enduro Operating LLC	Produced Hydrocarbons	
8522	Enduro Operating LLC	Produced Hydrocarbons	
8524	Enduro Operating LLC	Produced Hydrocarbons	
8525	Enduro Operating LLC	Produced Hydrocarbons	
8526	Enduro Operating LLC	Produced Hydrocarbons	
8527	Enduro Operating LLC	Produced Hydrocarbons	
8528	Enduro Operating LLC	Produced Hydrocarbons	
8529	Enduro Operating LLC	Produced Hydrocarbons	
8530	Enduro Operating LLC	Produced Hydrocarbons	
8531	Enduro Operating LLC	Produced Hydrocarbons	
8532	Enduro Operating LLC	Produced Hydrocarbons	
8533	Enduro Operating LLC	Produced Hydrocarbons	
6578	Corinthian Exploration (USA) Corp.	Crude Oil	
6579	Corinthian Exploration (USA) Corp.	Crude Oil	
6580	Corinthian Exploration (USA) Corp.	Crude Oil	
7507	Corinthian Exploration (USA) Corp.	Crude Oil	
7509	Corinthian Exploration (USA) Corp.	Crude Oil	
7510	Corinthian Exploration (USA) Corp.	Crude Oil	
7511	Corinthian Exploration (USA) Corp.	Crude Oil	
7512	Corinthian Exploration (USA) Corp.	Crude Oil	
7513	Corinthian Exploration (USA) Corp.	Crude Oil	
7514	Corinthian Exploration (USA) Corp.	Crude Oil	
7515	Corinthian Exploration (USA) Corp.	Crude Oil	
7516	Corinthian Exploration (USA) Corp.	Crude Oil	
7517	Corinthian Exploration (USA) Corp.	Crude Oil	
13333	Corinthian Exploration (USA) Corp.	Crude Oil	
13334	Corinthian Exploration (USA) Corp.	Crude Oil	
13336	Corinthian Exploration (USA) Corp.	Crude Oil	

13337	Corinthian Exploration (USA) Corp.	Crude Oil	
13338	Corinthian Exploration (USA) Corp.	Crude Oil	
13339	Corinthian Exploration (USA) Corp.	Crude Oil	
13340	Corinthian Exploration (USA) Corp.	Crude Oil	
13341	Corinthian Exploration (USA) Corp.	Crude Oil	
13343	Corinthian Exploration (USA) Corp.	Crude Oil	
13345	Corinthian Exploration (USA) Corp.	Crude Oil	
13346	Corinthian Exploration (USA) Corp.	Crude Oil	
13347	Corinthian Exploration (USA) Corp.	Crude Oil	
13348	Corinthian Exploration (USA) Corp.	Crude Oil	
13351	Corinthian Exploration (USA) Corp.	Crude Oil	

Facility Name	Facility Address	City
Newburg Spearfish Charles Unit P-720	SENE 4-161N-79W	Newburg
Newburg Spearfish Charles Unit P-718	SESE 4-161N-79W	Newburg
Newburg Spearfish Charles Unit M-719	NWSW 4-161N-79W	Newburg
Newburg Spearfish Charles Unit N-720	SENE 4-161-79	Newburg
Newburg Spearfish Charles Unit J-720	SENE 5-161-79	Newburg
Newburg Spearfish Charles Unit K-721	NWNE 5-161-79	Newburg
After A #1	NW NE S6-T163-R78	Souris
Almon Lee #2	SW NE S11-T162-R80	Westhope
Almon Lee #2	SW NE S11-T162-R80	Westhope
Anderson G2, Anderson H1	SW SW, NE SW S33-T164-R78	Souris
Axel Houmann #2	SW NE S15-T162-R80	Westhope
Axel Houmann #2	SW NE S15-T162-R80	Westhope
Bertha Bryce Estate #1	SW NE S10-T162-R80	Westhope
Bertha Bryce Estate #1	SW NE S10-T162-R80	Westhope
Edward Jensen 1R	NE SW S11-T162-R80	Westhope
George Wright #1	SW NW S23-T162-R80	Westhope
George Wright #1	SW NW S23-T162-R80	Westhope
Gravseth A1	SW NE S31-T164-R78	Souris
Gravseth A1	SW NE S31-T164-R78	Souris
Gravseth BR	SE NE S36-T164-R79	Souris
Harold W. Artz #1	SE NW S22-T163-R82	Antler
Herman Haugen #1	SW SE S3-T162-R80	Westhope
Jensen 1AR	SW NW S24-T162-R80	Westhope
Johnson #24-19	SE SW S19-T163-R82	Antler
Kjelshus 21-15 #1	NE NW S15-T163-R78	Souris
Leona Tennyson #1	SW NE S24-T163-R83	Antler
Leona Tennyson #1	SW NE S24-T163-R83	Antler
Morris 11-29	NW NW S29-T163-R82	Antler
Ovrid 1-11	NE NE S11-T162-R80	Westhope
P.M. King #2	NE NE S23-T162-R30	Westhope
P.M. King Estate 1-AR	NE NE S23-T162-R30	Westhope
Pearson 31-30 and Pearson 42-30	NW NE S30-T163-R82	Antler
Pearson 36-15	SW SE S36-T163-R83	Antler
Ralph Smith #1 and Ralph Smith #2	SE NW S21-T163-R82	Antler
South Westhope #42-34	SW NW S3-T162-R80	Westhope
Tootle #1	NW SE S22-T163-R82	Antler
Ferrellgas - Bottineau	101 N. Main Street	Bottineau
DAP Lansford Fertilizer	1015 Cypress Ave.	Lansford
DAP Lansford Fertilizer	1015 Cypress Ave.	Lansford
DAP Lansford NH3	1015 Cypress Ave.	Lansford
DAP Kramer Chem. & Fert.	450 County Road 20	Kramer
DAP Kramer Chem. & Fert.	450 County Road 20	Kramer
DAP Kramer Chem. & Fert.	450 County Road 20	Kramer
DAP Kramer Chem. & Fert.	450 County Road 20	Kramer
DAP Kramer Chem. & Fert.	450 County Road 20	Kramer

DAP Kramer Chem. & Fert.	450 County Road 20	Kramer
DAP Kramer Chem. & Fert.	450 County Road 20	Kramer
DAP Kramer Chem. & Fert.	450 County Road 20	Kramer
DAP Kramer NH3	450 County Road 20	Kramer
DAP Antler NH3	101 Main Street	Antler
DAP Souris Chem.& Fert.	10130 County Road 37	Souris
DAP Souris Chem.& Fert.	10130 County Road 37	Souris
DAP Souris Chem.& Fert.	10130 County Road 37	Souris
DAP Souris Chem.& Fert.	10130 County Road 37	Souris
DAP Souris Chem.& Fert.	10130 County Road 37	Souris
DAP Souris Chem.& Fert.	10130 County Road 37	Souris
DAP Souris Chem.& Fert.	10130 County Road 37	Souris
DAP Souris NH3	10130 County Road 37	Souris
DAP Newburg Chemical	315 Main Street	Newburg
DAP Newburg Chemical	315 Main Street	Newburg
DAP Newburg Chemical	315 Main Street	Newburg
DAP Newburg Chemical	315 Main Street	Newburg
DAP Newburg Chemical	315 Main Street	Newburg
DAP Newburg Chemical	315 Main Street	Newburg
DAP Newburg Fertilizer	185 County Road 20	Newburg
DAP Newburg Fertilizer	185 County Road 20	Newburg
DAP Newburg Fertilizer	185 County Road 20	Newburg
DAP Newburg NH3	185 County Road 20	Newburg
Wal-Mart Store #4569	912 11th Street E.	Bottineau
Bottineau Municipal Airport Authority	9770 13th Ave NE	Bottineau
Ballantyne Oil-Spring Coulee CTB	NWSW 22-159-83	Lansford
Ballantyne Oil-Southwest Landa Field	SESE 5-162-79, SSENW & NWSW 4-162-79, NWNW9-162-79	Landa
Ballantyne Oil-North Souris Field	NWSW 3-163-77. SWNW 3-163-77	Souris
Ballantyne Oil-Kanu Field	SESW 12-161-79, SESE 12-161-79, SESW 12-161-79	Newburg
Ballantyne Oil-Sagsveen CTB	N/2 Sec. 21, T159N, R83W	Lansford
Bottineau CO	403 Sinclair St.	Bottineau
Kramer CO	2 Charles St.	Kramer
Souris CO	201 Minnesota St.	Souris
Willow City CO	1893 Country Rd.	Willow City
Berenergy Corporation - Nelson State Tank Battery	Sec 36, T159N-R82W	Glenburn
Berenergy Corporation - O'Connell Tank Battery	Sec 36, T159N-R82W	Glenburn
Berenergy Corporation - Reiquam State Tank Battery	Sec 36, T159N-R82W	Glenburn

SRC Service Station	315 Main St.	Newburg
SRC Service Station	315 Main St.	Newburg
SRC Service Station	315 Main St.	Newburg
FUOC-Willow City Bulk Plant	SW of Prairie Street & CR 28A	Willow Ctiy
FUOC-Willow City Bulk Plant	SW of Prairie Street & CR 28A	Willow Ctiy
FUOC-Willow City Bulk Plant	SW of Prairie Street & CR 28A	Willow Ctiy
FUOC-Willow City Bulk Plant	SW of Prairie Street & CR 28A	Willow Ctiy
FUOC-Willow City Chemical Storage	394 Main Street	Willow Ctiy
FUOC-Willow City Chemical Storage	394 Main Street	Willow Ctiy
Plains Mktg Max Bass Truck Station	S32 T161N R81W, 3 mi W of Max Bass	Max Bass
MacTavish	SWNE Sec 30-T160N-R83W	Lansford
MacTavish	SWNE Sec 30-T160N-R83W	Lansford
Larson 41-30	NENE Sec 30-T160N-R83W	Lansford
Larson 41-30	NENE Sec 30-T160N-R83W	Lansford
Alice Jean 33-30	NWSE Sec 30-160N-R83W	Lansford
Smetana 1-31	NENW Sec 31-160N-R83W	Lansford
Smetana 1-31	NENW Sec 31-160N-R83W	Lansford
Smetana 1-31	NENW Sec 31-160N-R83W	Lansford
Oberholtzer 1-30	SESW Sec 30-T160N-R83W	Lansford
Oberholtzer 1-30	SESW Sec 30-T160N-R83W	Lansford
Oberholtzer 1-30	SESW Sec 30-T160N-R83W	Lansford
Kane Madison Unit	NWSE 35-162-79	Newburg
Kuroki CTB	NENW	Kuroki
Adams CTB	NENW 6-160-82	Lansford
SEM 22-8	SENE 22-162-79	Landa
Rice CTB	SWSW 9-161-82	Renville
Cramer CTB	NWSE 8-161-82	Renville
Erickson CTB	SWSE 30-162-82	Mohall
Bly 30 CTB	SWSW 30-163-91	Lignite
Bly 31 CTB	NWNW 31-163-91	Lignite
Aune 1	NWSW 6-162-79	Westhope
South Landa Unit	SENE 3-162-79	Landa
Martin 1	SWSE 2-162-80	Westhope
Clark 1-R	NWNW 14-162-80	Westhope
Moore-Jensen CTB	SESW 15-162-80	Westhope
Lervick CTB	SWSE 5-160-78	Kramer
Goodman CTB	NENW 9-160-78	Kramer
Esther Steinhaus 1	SWSW 29-162-81	Westhope
Hedges CTB	SESW 30-162-81	Westhope
Steinhaus CTB	NESE 30-162-81	Westhope

Evanson CTB	NENW 31-162-81	Westhope
Bronderslev CTB	NWSW 32-162-81	Renville
Peterson 1	SWSE 32-162-81	Renville
Anderson CTB	SESE 25-162-82	Westhope
Hefty Seed Mohall	3588 Hwy 5 NW	Mohall
Hefty Seed Mohall	3588 Hwy 5 NW	Mohall
Hefty Seed Mohall	3588 Hwy 5 NW	Mohall
Hefty Seed Mohall	3588 Hwy 5 NW	Mohall
Carbury Land Port of Entry	10919 Highway 14 Northeast	Carbury
Westhope Land Port of Entry	10923 Highway 83	Westhope
Anderson 31-25 #1 Tank Battery	Lat/Long	Souris
Anderson et al #1-24 Tank Battery	Lat/Long	Souris
Anton A #1 Tank Battery	Lat/Long	Souris
Ballantyne - State #1 Tank Battery	Lat/Long	Maxbass
Billehus 43-4 #1 Tank Battery	Lat/Long	Souris
Brandjord Kjelshus 9-10 Tank Battery	Lat/Long	Souris
Dagmar Fossum #1 Tank Battery	Lat/Long	Maxbass
Donald Boll #1-34	Lat/Long	Kramer
Erickson Tank Battery	Lat/Long	Souris
Esther Steinhaus #1 Tank Battery	Lat/Long	Westhope
Fossum Tank Battery	Lat/Long	Maxbass
Fredlund 16-6H Tank Battery	Lat/Long	Souris
Gravseth #1 Tank Battery	Lat/Long	Souris
Haakenstad A #1 Tank Battery	Lat/Long	Souris
Harold Lindstrom #1-R Tank Battery	Lat/Long	Souris
Howard Nordmark #1 Tank Battery	Lat/Long	Souris
Howard Nordmark #2 SWD Tank Battery	Lat/Long	Souris
Hultgren #1 Tank Battery	Lat/Long	Souris
Issendorf #1-21 Tank Battery	Lat/Long	Newburg
Juve Tank Battery	Lat/Long	Souris
Lawrence Hanson #1 Tank Battery	Lat/Long	Souris
LWMU Tank Battery	Lat/Long	Souris
NE Landa #6-5 Tank Battery	Lat/Long	Souris
Obert Linstad #1 Tank Battery	Lat/Long	Souris
Rice Tank Battery	Lat/Long	Souris
Romsos #1-21 Tank Battery	Lat/Long	Souris
SSMU Central Production Facility Tank Battery	Lat/Long	Kramer
Stella Rice Tank Battery	Lat/Long	Souris
Sveen #2 Tank Battery	Lat/Long	Souris
Thorenson-Hunsker #2 Tank Battery	Lat/Long	Newburg
Tonneson #1 Tabnk Battery	Lat/Long	Kramer
W&M Peterson #3A SWD Tank Battery	Lat/Long	Maxbass
Waddle #7-29 Tank Battery	Lat/Long	Kramer
Witteman #1 Tank Battery	Lat/Long	Maxbass
Haram 34-21H	SW SE Sec 21 T163N, R77W	Souris
Brandjord CTB (1,2,3,4-20)	SE SE Sec 20 T163N, R78W	Roth

Lavone #1-29	NW NW Sec 29 T163N, R78W	Roth
Nordmark 31-29 #1	NW NE Sec 29 T163N, R78W	Roth
Hertel 4H	SE SE Sec 14 T159N, R82W	Glenburn
Nelson-Sharon 1-H	SE SW Sec 13 T159N, R82W	Glenburn
Routledge 1-13	SW SE SEC 13, T159N, R82W	Glenburn
Sharon 11-24 #3	NW NW Sec 24 T159N, R82W	Glenburn
Haakenstad 22-21 #1	SE NW Sec 21 T163N, R77W	Souris
Madsen-Johnson 21-28 #5	NW NE Sec 28 T163N, R77W	Souris
Moen Trust 43-21 #2	NE SE Sec 21 T163N, R77W	Souris
Koehler #1 Battery	NW NE Sec 23 T162N, R81W	Westhope
Nelson #3-13	SW SW Sec 13 T159N, R82W	Glenburn
Haakenstad 11-21 # 2	NW NW Sec 21 T163N, R77W	Souris
Haram 24-21 H	SW SE Sec 21 T163N, R77W	Souris
Haram 24-21 H	SW SE Sec 21 T163N, R77W	Souris
Stead 1,2,3 Main Battery	SW SE Sec 14 T162N, R81W	Westhope
SRT Communications, Inc. Maxbass AFC	9152 24th Ave NW	Maxbass
SRT Communications, Inc. Lansford	660 Laurel St	Lansford
SRT Communications, Inc. Metigoshe E	2095 Hwy 43	Lake Metigoshe
SRT Communications, Inc. Metigoshe North	17 Longview Rd E	Lake Metigoshe
SRT Communications, Inc. Newburg	253 3rd Ave	Newburg
SRT Communications, Inc. Antler	111 Vida St	Antler
SRT Communications, Inc. Landa	210 Souris Ave	Landa
SRT Communications, Inc. Maxbass	9011 County Rd 17B	Maxbass
NDDOT BOTTINEAU	9840 Lake Rd,	Bottineau
FUO WESTHOPE BULK PLANT	US 83	WESTHOPE
FUO WESTHOPE BULK PLANT	US 83	WESTHOPE
FUO WESTHOPE BULK PLANT	US 83	WESTHOPE
FUO WESTHOPE BULK PLANT	US 83	WESTHOPE
FUO WESTHOPE WAREHOUSE	25 RAILWAY AVE EAST	WESTHOPE
FUO SOURIS WAREHOUSE	118 MAIN ST	SOURIS
FUO SOURIS BULK PLANT	118 MAIN ST	SOURIS
FUO SOURIS BULK PLANT	118 MAIN ST	SOURIS
FUO SOURIS BULK PLANT	118 MAIN ST	SOURIS
FUO SOURIS BULK PLANT	118 MAIN ST	SOURIS
FUO BOTTINEAU LP PLANT	207 WEST 11TH STREET	BOTTINEAU
FUO BOTTINEAU WAREHOUSE	207 WEST 11TH STREET	BOTTINEAU
Wiley_Erickson Central Tank Battery	SWSE Sec 19 T161N R81W	Rural
Wiley_Brendsel Central Tank Battery	Lattitude - Longitude	rural
Wiley_Brown P Central Tank Battery	N/2SE Sec 30 T161N R82W	Maxbass
Wiley_Bull Central Tank Battery	NESW 23 T161N R082W	Maxbass
South Westhope_Federal Houmann A-1	Lat Long	Westhope
South Westhope_Haugen A-1 & A-3 Tank Battery	SWNW 10 T162N R080W	Westhope

South Westhope_Houmann C-4, C-5, C-6, Tank Battery	Lat Long	Westhope
South Westhope_Jensen B-1 UCLI Jaobsen 1R	Coordinates	Westhope
South Westhope_Jensen C-1A	SWSE 15 T162N R80W	Westhope
South Westhope_King G 1a	SWSW 24 T162N R80W	Bowbells
South Westhope_Thomspson M-1	SWSW 03 T162N R80W	Westhope
Wiley_Durnin Central Tank Battery	Lat Long	Maxbass
Wiley_Fossum A-30H Tank Battery	SWNE 30 T161N R81W	Maxbass
Wiley_Fossum B & D Tank Battery	NWNE 30 T161N R81W	Maxbass
Wiley_Myrtle Grorud Tank Battery	Lat Long	Maxbass
Wiley_Haakensen Central Tank Battery	NWNE 32 T161N R81W	Maxbass
Wiley_Kirby Central Tank Battery	NENW 23 T161N R82W	Maxbass
Wiley_Straton C Central Battery	NWSE Sec 24 T161N R82W	Maxbass
Wiley_TA Wiley Central Battery	SESW 19 T161N R81W	Maxbass
Wiley_Wilms Tank Battery	NESE 23 T161N R82W	Maxbass
Wiley_Witherstine Central Tank Battery	Lat Long	Maxbass
South Westhope_Croak A-1	NENW 25 T162N R80W	Westhope
CHSU_Canter WSW	Lat Long	Rhame
Wiley_Brown Haakenson 3-32	Lat Long	Rural
Wiley_Haugen Central Tank Battery	Lat Long	Maxbass
Bottineau Farmers Elevator Oil	1199 98th St NE	Bottineau
Bottineau Farmers Elevator Oil	1199 98th St NE	Bottineau
Bottineau 115kV Substation	312 11th St East	Bottineau
Dunning 115kV Substation	1402 County Road 20 NW	Maxbass
Dunning 115kV Substation	1402 County Road 20 NW	Maxbass
Kramer Substation	8794 1st Ave NE	Kramer
Antler Substation	2594 99th St NW	Antler
Lansford Substation	3003 84th St NW	Lansford
Metigoshe Substation	10602 Lake Loop Road	Bottineau
Newburg Substation	998 County Road 20 NW	Newburg
Souris Substation	10303 1st Ave NE	Souris
Westhope Substation	1411 Highway 5 NW	Westhope
Wiley Substation	9298 24th Ave NW	Maxbass
Newburg Spearfish Charles Unit S-709AHR	NWNE 22-161-79	Newburg
Newburg Spearfish Charles Unit S-709	NWNE 22-161-79	Newburg
Newburg Spearfish Charles Unit U-707	NWSW 23-161-79	Newburg
Newburg Spearfish Charles Unit U-707AHR	NWSW 23-161-79	Newburg
Newburg Spearfish Charles Unit V-705	NENW 26-161-79	Newburg
Newburg Spearfish Charles Unit O-705	NWNE 28-161-79	Newburg
Newburg Spearfish Charles Unit O-705AH	NWNE 28-161-79	Newburg
SWSCU 18-34	SWSE 18-162-79	Westhope
SWSCU 19-41	NENE 19-162-79	Westhope
SWSCU 19-43	NESE 19-162-79	Westhope
SWSCU 19-34	SWSE 19-162-79	Westhope
SWSCU 20-12	SWNW 20-162-79	Westhope

SWSCU 29-12	SWNW 29-162-79	Westhope
SWSCU 30-41	NENE 30-162-79	Westhope
SWSCU 30-43	NESE 30-162-79	Westhope
SWSCU 30-21	NENW 30-162-79	Westhope
SWSCU 30-12	SWNW 30-162-79	Westhope
Newburg Spearfish Charles Unit F-724	SENW 31-162-79	Newburg
Newburg Spearfish Charles Unit H-722	SESE 31-162-79	Newburg
Newburg Spearfish Charles Unit J-722	SESW 32-162-79	Newburg
NORTH WESTHOPE-MADISON UNIT C-5	NENE 2-163-80	Westhope
ANTLER MIDALE UNIT 14-19	SWSW 19-163-81	Antler
ANTLER MIDALE UNIT 13-19	NWSW 19-163-81	Antler
ANTLER MIDALE UNIT 11-30	NWNW 30-163-81	Antler
ANTLER MIDALE UNIT 12-30	SWNW 30-163-81	Antler
ANDERSON 2	SENW 20-163-82	Antler
WATLAND 1	SENE 23-163-82	Antler
WATLAND A 1	SWNW 24-163-82	Antler
ANTLER MIDALE UNIT 43-24	NESE 24-163-82	Antler
ANTLER MIDALE UNIT 44-24	SESE 24-163-82	Antler
ANTLER MIDALE UNIT 42-25	SENE 25-163-82	Antler
ANTLER MIDALE UNIT 32-25	SWNE 25-163-82	Antler
HAROLD GRAVSETH 1	SWSE 31-164-78	Landa
NORTH WESTHOPE-MADISON UNIT GB-2R	SWNE 35-164-80	Westhope
NWMU A-11H	SENW 36-164-80	Westhope
NWMU A-10H	SESE 36-164-80	Westhope
NORTH WESTHOPE-MADISON UNIT A-8	NWSE 36-164-80	Westhope
Dome Maxbass Substation	1694 89th St NW	Maxbass
Bottineau SE Substation	9605 13th Ave NE	Bottineau
Bottineau SE Substation	9605 13th Ave NE	Bottineau
Long Lake Substation	10537 19th AV NE	Bottineau
BFE Bottineau NH3 Plant	1190 98 St NE	Bottineau
Bottineau Agronomy Center	1090 Hiway 5 NE	Bottineau
Westhope Agronomy	100 Railway Ave	Westhope
Bottineau Farmers Elevator Souris	136 Railroad Ave East	Souris
BFE Gardena NH3 Plant	8881 Co Rd 47	Bottineau
Eagle Operating, Inc./Russel Facility/ Tvedt 2 & T	Section 9-160-79	Newburg
Eagle Operating, Inc./Russel Facility/ Tvedt 2 & T	Section 9-160-79	Newburg
Eagle Operating, Inc./Scandia Facility/ Bradford K	Section 9-163-78	Souris
Eagle Operating, Inc. / North Haas Facility/Ter Ha	SENE Sec 21-163-82	Antler
CLR - SACU #1-31	31, 164N, 083W	Bottineau
CLR - SACU CTB	32, 164N, 083W	Bottineau
LWMU Satellite Battery	Rural	Westhope
LWMU Central Battery	Rural	Westhope
Anderson 25 Battery	Rural	Westhope

Anderson 24 Battery	Rural	Westhope
Hultgren Battery	Rural	Westhope
Juve Battery	Rural	Westhope
Engstrom Battery	Rural	Sherwood
Anton Battery	Rural	Souris
Erickson Battery	Rural	Souris
Erickson 2 Battery	Rural	Souris
SSMU Central Battery	Rural	Newburg
THorenson-Hunskor 2	Rural	Newburg
Thorenson-Hunskor 3	Rural	Newburg
Donald Boll 1-34	Rural	Newburg
Christenson Battery	Rural	Newburg
Ballantyne-State/Steinhaus Battery	Rural	Westhope
Oscar Fossum Battery	Rural	Westhope
Obert Linstad #1	Rural	Westhope
Rice Battery	Rural	Westhope
O. & V. Johnson Battery	Rural	Newburg
Newburg Spearfish Charles Unit L-718	SESE 5-161-79	Newburg
Newburg Spearfish Charles Unit I-719	NWSW 5-161-79	Newburg
Newburg Spearfish Charles Unit J-718	SESW 5-161-79	Newburg
Newburg Spearfish Charles Unit H-718	SESE 6-161-79	Newburg
Newburg Spearfish Charles Unit H-720	SENE 6-161-79	Newburg
Newburg Spearfish Charles Unit H-714	SESE 7-161-79	Newburg
Newburg Spearfish Charles Unit G-717	SENE 7-161-79	Newburg
Newburg Spearfish Charles Unit L-716	SENE 8-161-79	Newburg
Newburg Spearfish Charles Unit J-716	SENE 8-161-79	Newburg
Newburg Spearfish Charles Unit L-714	SESE 8-161-79	Newburg
Newburg Spearfish Charles Unit M-715	NWSW 9-161-79	Newburg
Newburg Spearfish Charles Unit N-716	SENE 9-161-79	Newburg
Newburg Spearfish Charles Unit O-717	NWNE 9-161-79	Newburg
Newburg Spearfish Charles Unit P-715AH	SESE 9-161-79	Newburg
Newburg Spearfish Charles Unit M-717AH	NWNW 9-161-79	Newburg
Newburg Spearfish Charles Unit N-716AHR	SENE 9-161-79	Newburg
Newburg Spearfish Charles Unit Q-715	NWSW 10-161-79	Newburg
Newburg Spearfish Charles Unit T-714	SESE 10-161-79	Newburg
Newburg Spearfish Charles Unit Q-715AHR	NWSW 10-161-79	Newburg
Newburg Spearfish Charles Unit U-711	NWSW 14-161-79	Newburg
Newburg Spearfish Charles Unit R-712BH	SENE 15-161-79	Newburg
Newburg Spearfish Charles Unit R-712AH	SENE 15-161-79	Newburg
Newburg Spearfish Charles Unit T-710	SESE 15-161-79	Newburg
Newburg Spearfish Charles Unit Q-711	NWSW 15-161-79	Newburg
Newburg Spearfish Charles Unit R-712	SENE 15-161-79	Newburg
Newburg Spearfish Charles Unit T-712AH	SWNE 15-161-79	Newburg
Newburg Spearfish Charles Unit M-711AH	SWNE 15-161-79	Newburg
Newburg Spearfish Charles Unit N-710	SESW 16-161-79	Newburg

Newburg Spearfish Charles Unit P-710	SESE 16-161-79	Newburg
Newburg Spearfish Charles Unit M-711	NWSW 16-161-79	Newburg
Newburg Spearfish Charles Unit O-712	SWNE 16-161-79	Newburg
Newburg Spearfish Charles Unit P-713	SWNE 16-161-79	Newburg
Newburg Spearfish Charles Unit K-713	NWNE 17-161-79	Newburg
Newburg Spearfish Charles Unit L-710	SESE 17-161-79	Newburg
Newburg Spearfish Charles Unit I-711	NWSW 17-161-79	Newburg
Newburg Spearfish Charles Unit K-707	NWSE 20-161-79	Newburg
Newburg Spearfish Charles Unit L-708	SENE 20-161-79	Newburg
Newburg Spearfish Charles Unit N-708	SENE 20-161-79	Newburg
Newburg Spearfish Charles Unit O-709	NWNE 21-161-79	Newburg
Newburg Spearfish Charles Unit P-706	SESE 21-161-79	Newburg
Newburg Spearfish Charles Unit M-707	NWSW 21-161-79	Newburg
Newburg Spearfish Charles Unit O-709AH	NWNE 21-161-79	Newburg
Corinthian Exploration - North Souris Unit	N/2 Sec. 33-164N-77W & S/2S/2 Sec. 28-164N-77W	n/a
Corinthian Exploration - Moen	1980' FSL & 1980' FEL or NWSE Sec 33-164N-77W	n/a
Corinthian Exploration - Olson	SE/4 Sec 33-164N-77W & Sec 4- 164N-77W	n/a
Corinthian Exploration - Backman 13-26 Facility	Lot 4, Sec 26-164N-77W 800 FNL 670 FWL	n/a
Corinthian Exploration - Backman 1-34 Facility	NENE Sec 34-164N-77W 660 FNL 645 FEL	n/a
Corinthian Exploration - Backman 16-34 Facility	SESE Sec 34-164N-77W 690 FSL 645 FEL	n/a
Corinthian Exploration - Berge 16-26 Facility	SESE 26-164N-77W 700 FSL 750 FEL	Souris
Corinthian Exploration - Bowers 8-3 Facility	SENE Sec 3-163N-77W 1980 FNL 645 FEL	n/a
Corinthian Exploration - Brenden 9-33 Facility	NESE Sec 33-164N-77W 2390 FSL 645 FEL	n/a
Corinthian Exploration - Feight 5-36 1-H	SWNW Sec 36-164N-77W 1980 FNL 645 FWL	n/a
Corinthian Exploration - McCullough 13-36 1-H	SWSW Sec 36-164N-77W 660 FSL 645 FWL	n/a
Corinthian Exploration - Skarphol 8-33 Facility	SENE Sec 33-164N-77W 1900 FNL 645 FEL	n/a
Corinthian Exploration - Skarphol 16-28 Facility	Lot 1 Sec 28-164N-77W 712 FNL 630 FEL	n/a
Corinthian Exploration - Scandia West Facility	SENE 34-164N-78W 1332 FNL 761 FEL	Souris
Corinthian Exploration - Scandia 3-36H	NESE 36-164N-78W 1636 FSL 185 FEL	Souris
Corinthian Exploration - McCullough 5-1 1-H	SWNW 1-163N-77W 2180 FNL 645 FWL	Souris

Corinthian Exploration - Kveum 5-32 Facility	SWNW 32-164N-78W 1980 FNL 800 FWL	Souris
Corinthian Exploration - Lochner 16-33 Facility	SESE 33-164N-77W 660 FSL 800 FEL	Souris
Corinthian Exploration - 2-Brenden 9-33 Facility	NESE 33-164N-77W 1767 FSL 1066 FEL	Souris
Corinthian Exploration - Derr 8-9 1-H	SENE 9-163N-77W 1610 FNL 750 FEL	Souris
Corinthian Exploration - Kornkven 1-32 1-H	NENE 32-164N-77W 730 FNL 750 FEL	Souris
Corinthian Exploration - Backman 15-35	SWSE 35-164N-77W 909 FSL 2319 FEL	Souris
Corinthian Exploration - Skarphol 13-28 Facility	SWSW 28-164N-77W	Souris
Corinthian Exploration - Berge 12-1 1-H	NWSW 1-163N-77W 2180 FSL 750 FWL	Souris
Corinthian Exploration - Lochner 1-4 1-H	Lot 1 Sec 4-163N-77W 660 FNL 785 FEL	Souris
Corinthian Exploration - Brandjord 9-4 1-H	NESE 4-163N 77W 1980 FSL 750 FEL	Souris
Corinthian Exploration - Boundary 1-11 1-H	NENE 11-163N-78W 1027 FNL 237 FEL	Souris

APPENDIX E

The DFIRM Maps that are available for Bottineau County are displayed in Appendix E.

Proposed Mitigation Projects for Boundary Lake Flooding

The Boundary Lake which is NE of Bottineau has been receiving some very high water the past few years. The home owners around the lake have been inundated with water in their cabins and also taking out a lot of their wells. On Monday June 15th 2015 a group of people met with the Bottineau County Resource board to discuss the problem. The water board told the group to put together a plan and then come back to the board.

After that meeting a committee was put together by the Bottineau County Emergency Management office. The committee consists of County Commissioners, Landowners in the area, Water Board members and Lake Property owners.

There are three possible scenarios to move the water out of Boundary Lake.

#1 there would be a culvert put in to move the water to Hartley Lake, both Hartley and Boundary Lakes extend into Canada which would make them both international waters. Challenges would be working with Canada to ok the project. This way would properly impact the least number of people and landowners

#2 there would be a ditch from Boundary Lake to private land on the west side of Boundary Lake. The water would pass through that property and would continue to the west going through several slough and lake areas. The water would then go into Lake Metigoshe and would exit into Oak Creek and to the Mouse River west of Willow City.

The challenges for number two would be the flow rate, getting permission from land owners downstream from Boundary Lake. Gates would have to put in place to control the flow at certain times of the year or when Metigoshe cannot handle the water. Permits from the State would be needed to allow the project.

The first landowner that the water would affect has already given his permission to cross his land.

#3 this would take water from Boundary Lake and send it south out of the Lake. The water would flow south and pass through sloughs and lakes and would enter Willow Creek east of Willow City. The water would then flow west and enter the Mouse River west of Willow City.

The challenges for number three would be the same as for number two.

The Hazard Mitigation Planning Committee has received indications that it would be much easier to get permission from landowners going west rather than south.

Appendix G, Adoption Resolutions

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Bottineau County Commission adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 1 day of Dec, 2015

Attested: Lisa Herbel
Lisa Herbel, Auditor

Signed: LeRoy Rude
LeRoy Rude, Chairman
Bottineau County Commission

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Antler City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 7 day of Dec, 2015

Attested: Karen Hanson
Karen Hanson, Auditor

Signed: Bruce Hanson
Bruce Hanson Mayor
Antler City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Bottineau City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 7th day of Dec., 2015

Attested: Penny Nostdahl
Penny Nostdahl, Auditor

Signed: Ben Aufforth
Ben Aufforth, Mayor
Bottineau City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Gardena City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 7 day of December, 2015

Attested: Kent Loe
Kenneth Loe, Auditor

Signed: Scott Loe
Scott Loe Mayor
Gardena City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

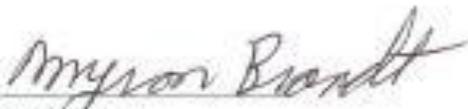
Whereas, the City of Kramer participated in the preparation of this plan in accordance with the Disaster Mitigation Act of 2000; and

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

Now, therefore, be it resolved, that the Kramer City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 7 day of December, 2015

Attested: 
Sharon Seibel, Auditor

Signed: 
Myron Brandt, Mayor
Kramer City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Landa City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 15th day of Dec, 2015

Attested Connie Engh, Aud
Connie Engh, Auditor

Signed: Craig George Mayor
Craig George Mayor
Landa City Council

Bottineau County Multi-Hazard Mitigation Plan

Whereas, the city of Lansford recognizes the threat that natural, manmade or technological hazards pose to people and property within our community; and

Whereas, undertaking 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 the Federal Emergency Management agency(FEMA) pre and post -disaster mitigation grant programs; and

Whereas, the city of Lansford participated in the preparation of this plan in accordance with the disaster Mitigation act of 2000; and

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

Now, therefore, be it resolved that the city of Lansford adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 14 day of December, 2015

Attested: Barbara Udlin
Name Barbara Udlin (print)
City Auditor

Signed Jeff Dean
Name Jeff Dean (print)
Lansford City Mayor

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Maxbass City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 12th day of Nov, 2015

Attested: Audrey L. Berger CA
Vacant, Auditor

Signed: Kevin B. Naumann
Kevin Naumann, Mayor
Maxbass City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Newburg City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 20 day of November, 2015

Attested: *Evette Bierman*
Evette Bierman, Auditor

Signed: *Bill Deschamp*
Bill Deschamp, Mayor
Newburg City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Overly City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 15 day of NOV., 2015

Attested: Margaret Wittmayer
Margaret Wittmayer, Auditor

Signed: Harvey Wittmayer
Harvey Wittmayer, Mayor
Overly City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Souris City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 5th day of December, 2015

Attested: 
None listed, Auditor

Signed: 
Steve Patterson, Mayor
Souris City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

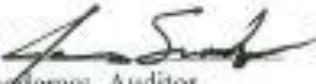
Whereas, the City of Westhope participated in the preparation of this plan in accordance with the Disaster Mitigation Act of 2000; and

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

Now, therefore, be it resolved, that the Westhope City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 7 day of December, 2015

Attested:


James Snodgrass, Auditor

Signed:


Margo Helgeson, Mayor
Westhope City Council

Bottineau County Multi-Hazard Mitigation Plan

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

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

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

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

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

Now, therefore, be it resolved, that the Willow City City Council adopts the Bottineau County Multi-Hazard Mitigation Plan.

Signed this 4th day of December, 2015

Attested: Shelly Volmer
Shelly Volmer, Auditor

Signed: William Fecho
William Fecho, Mayor
Willow City Council

Appendix H, Approval Letters and Plan Review Tool



ND Department of Emergency Services

PO Box 5511

Tel: (701) 328-8100

Email: nddes@nd.gov

Bismarck, ND 58506-5511

Fax: (701) 328-8181

Website: www.nd.gov/des

Ensuring a safe and secure homeland for all North Dakotans

January 5, 2016

LeRoy Rude, Chairman
Bottineau County Commission
314 5th Street West
Bottineau ND 58318

Dear Chairman Rude:

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

The Federal Emergency Management Agency (FEMA) Region VIII, approved the Bottineau County Multi-Hazard Mitigation Plan (MHMP) December 30 2015, through December 29, 2020, for Bottineau County, and the Cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope and Willow City.

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, and 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 Bottineau 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.

Jack Dalrymple
Governor

Major General Alan S. Dohmann
Director – Department of Emergency Services

Greg M. Wilz
Director - Division of Homeland Security

Mike Lynk
Director - Division of State Radio

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, Deputy Chief for Recovery and Mitigation Planning, at 701-328-8113, kdonahue@nd.gov.

Thanks for all your hard work.

Sincerely,

A handwritten signature in black ink, appearing to read 'C Schulz', with a stylized, cursive script.

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

Enclosures: 12-30-2015 FEMA Approval Letter, Plan Review Tool

cc: Rick Hummel, Bottineau County Emergency Manager



FEMA

R8-MT

December 30, 2015

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

Dear Mr. Schulz:

We are pleased to announce the approval of the **Bottineau County Multi-Hazard Mitigation Plan** as meeting the requirements of the Stafford Act and Title 44 Code of Federal Regulations 201.6 for a local hazard mitigation plan. The plan approval extends to the following participating jurisdictions that have adopted the plan: **Bottineau County and the Cities of Antler, Bottineau, Gardena, Kramer, Landa, Lansford, Maxbass, Newburg, Overly, Souris, Westhope and Willow City.**

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. Approved mitigation plans may be eligible for points under the National Flood Insurance Program Community Rating System.

This plan is approved through December 29, 2020. 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 jurisdictions that participated in the planning process and commend your continued commitment to reducing future disaster losses.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeanine D. Petterson".

Jeanine D. Petterson
Mitigation Division Director

Enclosure: Plan Review Tool

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

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Bottineau County	Title of Plan: Multi-Hazard Mitigation Plan	Date of Plan: August 26, 2015
Local Point of Contact: Rick Hummel	Address: 314 5 th St. West Bottineau, ND 58318	E-Mail: rick.hummel@co.bottineau.nd.us
Title: Emergency Manager		
Agency: Bottineau County Emergency Management		
Phone Number: 701-228-5916		

State Reviewer: Kathleen Donahue, NDDDES	Title: Mitigation Planning Officer	Date: 9/9/2015, 10/9/2015
--	--	-------------------------------------

FEMA Reviewer: Margaret Doherty	Title: Community Planner	Date: October 29, 2015
Date Received in FEMA Region VIII	October 13, 2015	
Plan Not Approved		
Plan Approvable Pending Adoption	November 2, 2015	
Plan Approved	December 30, 2015	

Bottineau County, ND | 2015

**SECTION 1:
MULTI-JURISDICTION SUMMARY SHEET**

MULTI-JURISDICTION SUMMARY SHEET									
#	Jurisdiction Name	Jurisdiction Type	Jurisdiction Contact	Email	Requirements Met (Y/N)				
					A. Planning Process	B. HIRA	C. Mitigation Strategy	D. Update Rqmts.	E. Adoption
1	Bottineau	County	Rick Hummel	rick.hummel@co.bottineau.nd.us	Y	Y	Y	Y	Y
2	Antler	City	Nathan Buynak	nbuynak@hotmail.com	Y	Y	Y	Y	Y
3	Bottineau	City	Katie Saykally	ktamburrino@hotmail.com	Y	Y	Y	Y	Y
4	Gardena	City	Ken Loe	Ken.loe@hotmail.com	Y	Y	Y	Y	Y
5	Kramer	City	Charlene Welstad	welstadcharles@yahoo.com	Y	Y	Y	Y	Y
6	Landa	City	Craig George	ccgeorge@srt.com	Y	Y	Y	Y	Y
7	Lansford	City	Barb Undlin	cityoflansford@srt.com	Y	Y	Y	Y	Y
8	Maxbass	City	Gerald Auvad	maxbasfire@sri.com	Y	Y	Y	Y	Y
9	Newburg	City	Evette Bierman	citynewburg@hotmail.com	Y	Y	Y	Y	Y
10	Overly	City	Harvey Wittmayer	oce@utma.com	Y	Y	Y	Y	Y
11	Souris	City	Rich Gimbel	gimbelfarms@yahoo.com	Y	Y	Y	Y	Y
12	Westhope	City	Ken Sletten	Ken@Kensletten.com	Y	Y	Y	Y	Y
13	Willow City	City	Judy Peterson	judyvschuchard58@hotmail.com	Y	Y	Y	Y	Y

**SECTION 2:
REGULATION CHECKLIST**

1. REGULATION CHECKLIST	Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)			
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Section 2, Pages 2-1>2-17, Appendix C	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Appendix C, April 21 e-mail; Section 2-3, page 2-7	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 2, Pages 2-1>2-17, Appendix C	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 2.3, Table 2.3C, Pages 2.6>2.7	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 6	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Section 6	X	
<u>ELEMENT A: REQUIRED REVISIONS</u>			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Section 4, 4.1>4.14	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Section 4, 4.1>4.14	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Section 4, 4.1>4.14	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 4.4.9, Pages 4.4-7>4.4-8; Appendix G	X	
<u>ELEMENT B: REQUIRED REVISIONS</u>			

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT C. MITIGATION STRATEGY				
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Section 1.3, Pages 1-5>1-6	X		
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Section 4.4.9, Pages 4.4-7>4>4-8	X		
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Executive Summary, Page 3-4; Section 5.1, Pages 5-3>5.4	X		
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Section 5.2.2, Pages 5-7>5.15	X		
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Section 5.3, Pages 5-17>5-19	X		
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Chapter 5, Section 5.4, Pages 5-20 Chapter 5, Section 6.4.2, Page 6-3 Chapter 5, Section 5.2.2, Table 5.2.2A, far right column	X		
<u>ELEMENT C: REQUIRED REVISIONS</u>				
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Section 1, Pages 1>16	X		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 5.2.1, Pages 5-4>5-8	X		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 1.1, Pages 1-1>1-2; Section 5.1, Pages 5-3>5.4	X		
<u>ELEMENT D: REQUIRED REVISIONS</u>				
ELEMENT E. PLAN ADOPTION				

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))				NA
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))		Section 2.1.2, Pages 2-3--2-4; Appendix F	X	
<u>ELEMENT E: REQUIRED REVISIONS</u>				
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)				
F1.				
F2.				
<u>ELEMENT F: REQUIRED REVISIONS</u>				

**SECTION 3:
PLAN ASSESSMENT**

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

State Comments:

Requirement A1 – The Bottineau County MHMP Team deserves accolades for its outreach with stakeholders by expanding participation to include private partners, regulatory agencies and adjoining jurisdictions.

The planning process was successful and robust with representation from jurisdictions, first responder organizations, North Central Electric Cooperative, First District Health Unit, St. Andrew’s Health, a retired citizen, Lake Metigoshe State Park, NDSU Extension Services media and the Minot Air Force Base. The broad-based involvement represents a major commitment by the Planning Team to ensure a “whole community” approach.

For the next update, include the N.D. Forest Service in Bottineau. The NDFS staff can assist with risk assessments of wildland fire and other hazards. Also invite Dakota College to the table.

Requirement A2 -- The planning process also achieved requirements to involve stakeholders with regulatory duties and representative of adjoining jurisdictions. Participants in plan development included the McLean County and McHenry County Emergency Managers, the Natural Resource Conservation Service, All Seasons Water Users, Bottineau Water Board.

Requirement A5 – For the next update, consider outreach efforts to discuss mitigation and the mitigation plan at community events such as fairs and festivals.

Requirement A6 – Consider leveraging the LEPC as a resource for tracking implementation of mitigation strategies. We recommend tracking progress on a yearly basis to ensure the plan continues to move forward and serve Bottineau County and its cities as a viable resource and plan.

Element B: Hazard Identification and Risk Assessment

State Comments:

Requirements B1 and B2 – The plan contained good, relevant data that can be leveraged for other plans. As an example, Table 4.2-1A, Bottineau County Dams, provided a good synopsis with information about the purpose of each dam, the year it was built, the hazard category, acreage and areas of inundation should a breach occur. Table 2A contains a good synopsis of the hazards and why they were included in the plan, as well as resources used for research. The Communicable Diseases section, as another example, is chock full of good information and analysis of potential impacts.

Requirement B3 -- For the next update, expand the analysis of vulnerabilities. In addition to referenced material in the risk assessment, Chapter 3 contained good information about the county and its communities from which analysis can be based, from the potential vulnerabilities created by a high social vulnerability to environmental hazards to the increase in development.

Element C: Mitigation Strategy

State Comments:

Requirement C3 – The vulnerability sections for each hazard should be leveraged more fully to guide development of more targeted mitigation strategies. While the section met requirements, the mitigation actions often were general and not specific. When updating the plan, take a look at the vulnerabilities more closely and see if actions can be more specific. For example, Mitigation Action #35 discusses installing new culverts and clean out storm drainage for the City of Landa. Try being more specific to include approximate locations of where the culverts are needed.

There are a number of good projects to use as an example, such as Mitigation Action #31 – Construct detention ponds on Oak Creek mainly in the Turtle Mountain area.

Requirement C4 – For the next update, leverage the solid planning team that has been assembled to look at more specificity with mitigation actions. For example, what actions can the NDFS help the team develop, or the NDSU Extension Service? The expertise and interest of the Planning Team will help refine strategies for the next update.

FEMA Comments:

Requirement C2 – FEMA agrees with the State's comments above. Additionally, the plan should include more detail as to the administration and management of floodplain permitting. It is critical the Floodplain Administrator for each jurisdiction participate in the process and describe their floodplain management program, such as ordinance updates,

mapping needs, public outreach, etc. Steps to improve the implementation of these programs should be included in the mitigation strategy.

Element D: Plan Review, Evaluation, and Implementation

State Comments:

Requirements for this section were met. It will be interesting to see how oil expansion changes in the next five years.

B. Resources for Implementing Your Approved Plan

State Comments:

The N.D. Department of Emergency Services is developing a Hazard Mitigation Toolbox on its webpage: <http://www.nd.gov/des/disaster/>. The goal is to provide guidance to emergency managers and their contractors regarding available resources.

FEMA Comments:

- The mitigation strategy includes projects that may be eligible for FEMA's grant programs. Contact your State Hazard Mitigation Officer for application information.
- Each year, FEMA partners with the State on training courses designed to help communities be more successful in their applications for grants, including the Unified Hazard Mitigation Grant Assistance Application Development Course and the Benefit Cost Analysis (BCA) course. Contact your State Hazard Mitigation Officer for course offering schedules.
- The US Department of Transportation's Hazardous Materials Emergency Preparedness (HMEP) grant program provides financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training. See this website for more information: <http://www.phmsa.dot.gov/grants-state-programs>.