Nelson County, North Dakota

including the Cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna

Multi-Hazard Mitigation Plan

2015 Revision

Revised in 2015 with assistance from:

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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 Nelson County Multi-Hazard Mitigation Plan was approved by the state and FEMA in 2003 and adopted shortly thereafter by Nelson County and its seven 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 Nelson County's and the Cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna and villages of Dahlen, Kloten, Mapes, and Whitman 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 Nelson 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)

Nelson County Hazard Prioritizations

This table that defines the Nelson County hazard prioritizations was taken from the 2013 Threat Hazard Identification Risk Assessment (THIRA) as of July 24, 2014.

2013 THIRA Step 1
Hazard/ Threat Identification Comparison
Nelson County

Nelson County	Score	Very Likely 5	Likely 4	Possible 3	Unlikely 2	Improbable 1
Catastrophic	5				Nuclear Terrorism Attack	
Significant	4				Biological Terrorism Attack (Nonfood) RDD Terrorism Attack	
Moderate	3			Chemical / Biological Food or Food Production Attack		
Minor	2	Winter Storm Summer Storms Flood	Armed Assault Chemical Substance Spill or Release Human Pandemic Outbreak Animal Disease Outbreak	Dam Failure Biological Food Contamination Explosives Terrorism Attack Radiological Substance Release	Chemical Terrorism Attack (Nonfood) Aircraft as a Weapon	
None/ Negligible	1		Wildfire	Cyber Attack		

As of: 7/24/2014

Notes: Moved from 2 to 1 in Consequences
Wildfire
Cyber Attack

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

- *Goal 1: Promote the use of mitigation measures that reduce the impacts of hazards.*
- *Goal 2: Protect the public from effects of summer storms and winter weather.*
- *Goal 3: Reduce flood losses to public and private property.*
- *Goal 4: Reduce possible wildland/rural fire losses to public and private property.*
- *Goal 5: Minimize losses from human-caused hazards.*
- *Goal 6: Provide life safety services.*

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 Nelson County and the jurisdictions. The Nelson County Emergency Management Office is responsible for the implementation and maintenance of the plan. Other recommended activities, such integrating this plan into a variety of county, city, and township plans, regulations, and documents, will further the goals of hazard mitigation in Nelson County.

The Nelson 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 Nelson County and the jurisdictions and provides a strategy for preventing or reducing some of the impacts.

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1. INTRODUCTION

Nelson County is confronted daily with the possibility of a serious incident of emergency proportions. Natural and human-caused 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 their 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 threat, 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 Nelson 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

Nelson County and the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna, the townships, and the unincorporated communities recognize that hazards, both natural and human-caused, threaten their communities. Rather than wait until 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:

- Fulfill federal, state, and local hazard mitigation planning responsibilities.
- 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.
- Support requests for grant funding.
- Encourage long-term community sustainability.

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 Nelson County Multi-Hazard Mitigation Plan is countywide. In this document when Nelson 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 Nelson County Multi-Hazard Mitigation Plan is organized into sections that describe the planning process, assets and community inventory, risk assessment/hazard profiles, mitigation strategies, actions and implementation, and plan maintenance. 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 Nelson County and the jurisdictions. The mitigation strategy outlines long-term solutions to possibly prevent or reduce future damages. Additional hazards may exist that were not apparent to local government 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. The program 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.

Flood Mitigation Assistance Programs

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 Nelson 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 Nelson 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 NDDES Approval letters and jurisdictional adoption documentation.

1.3 Authorities

The Nelson County Multi-Hazard Mitigation Plan has been prepared by Nelson 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.

Nelson County and Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna 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.

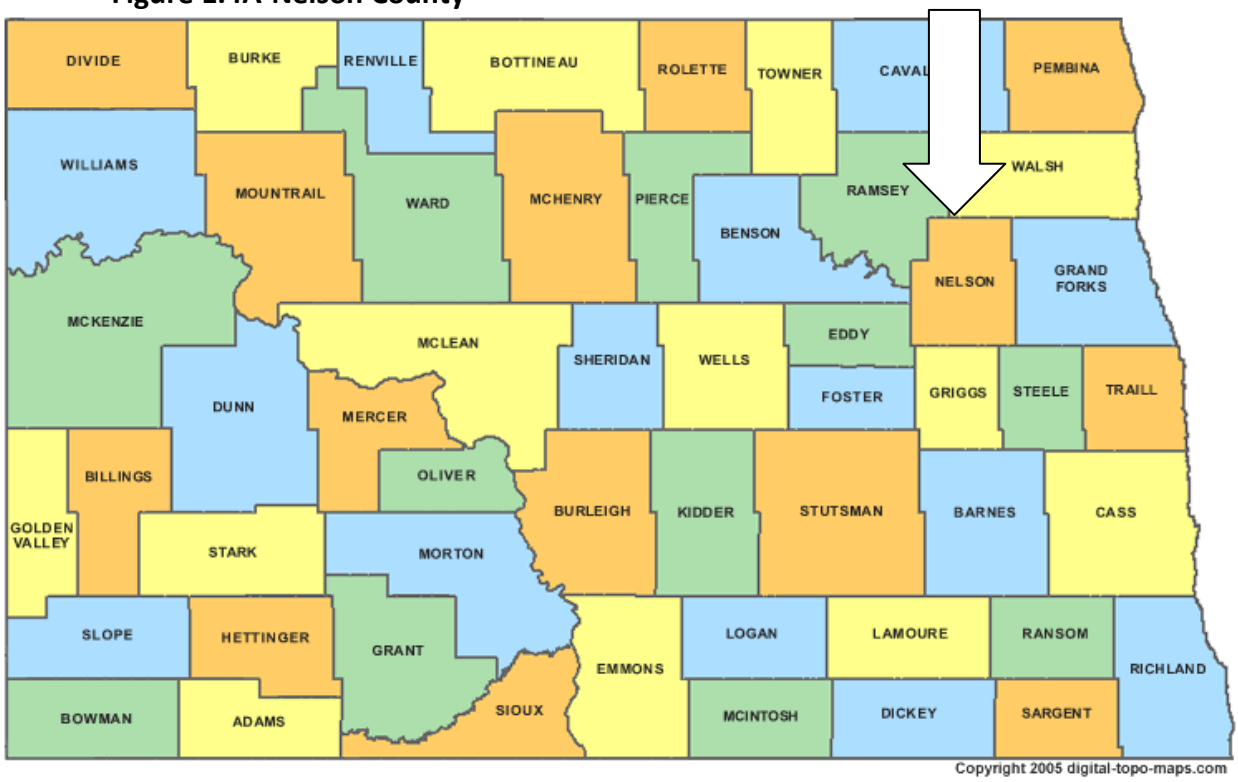
1.4 County and Jurisdictional Overview

Nelson County is located in northeastern North Dakota as shown in Figure 1.4A. Nelson County is comprised of approximately 982 square miles and is bordered by the counties of Ramsey, Walsh, Griggs, Benson, Eddy, Steele and Grand Forks. Lakota is the official county seat. Cities in the county are Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna. Villages or unincorporated town sites are Dahlen, Kloten, Mapes, and Whitman. There are twenty-seven townships in the county.

Nelson County had a 2013 estimated population of 3,095 (3,126 people with 2010 census data). The county's population ratio is about 3.2 people per square mile. (US Census Bureau, 2010)

Merchant wholesaler sales in 2007 were $138,226,000 which makes it the leader in the Nelson County economy (US Census Bureau 2007). The market value of agricultural products sold in 2007 was $85,369,000 making it the second economic factor in Nelson County Source: http://www.agcensus.usda.gov/Publications/2007/Full_Report/Volume_1,_Chapter_2_County_Level/North_Dakota/st38_2_001_001.pdf). Retail Sales were $24,384,000 (US Census Bureau 2007).

Figure 1.4A-Nelson County

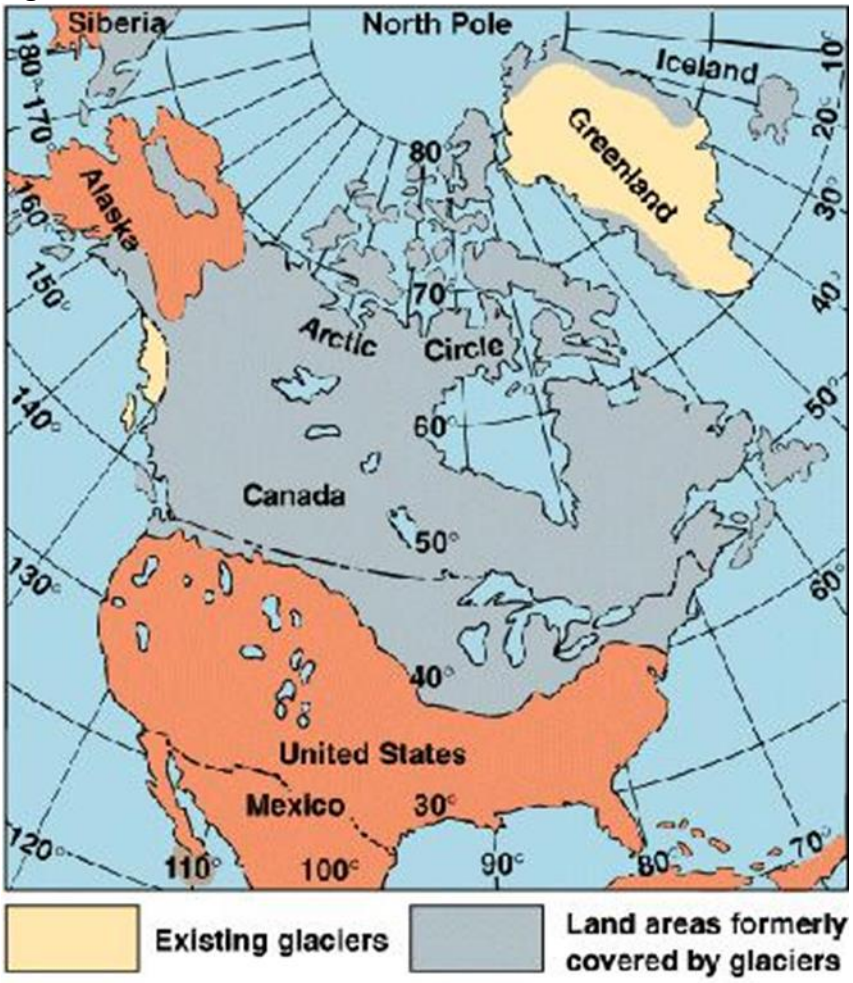


1.4.1 Geography

The last Great Ice Age, which began about 1.6 million years ago, dramatically affected the geology and life of North Dakota and Nelson 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 Nelson County was formed. The ice sheet pushed huge quantities of glacial till into what is now Nelson 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

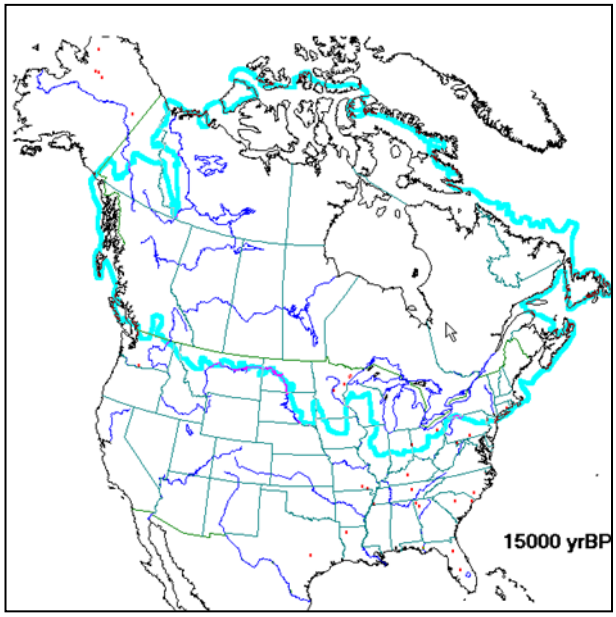
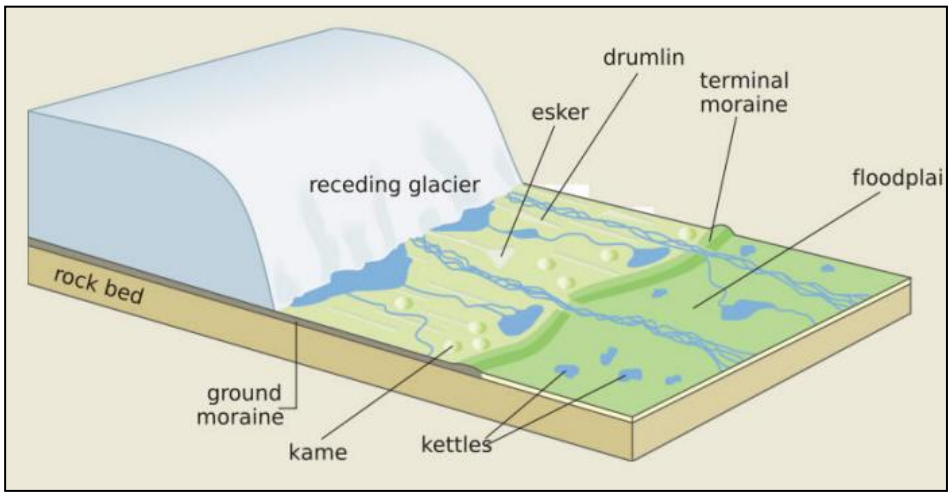


Figure 1.4C to the right outlines in blue the extent of the Laurentide Ice Sheet 15,000 years ago. Geologists have found material left by the ice throughout this area, proving that virtually all of Canada and most of North Dakota including all of Nelson County were once covered by thick glacial ice.

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 Nelson County.

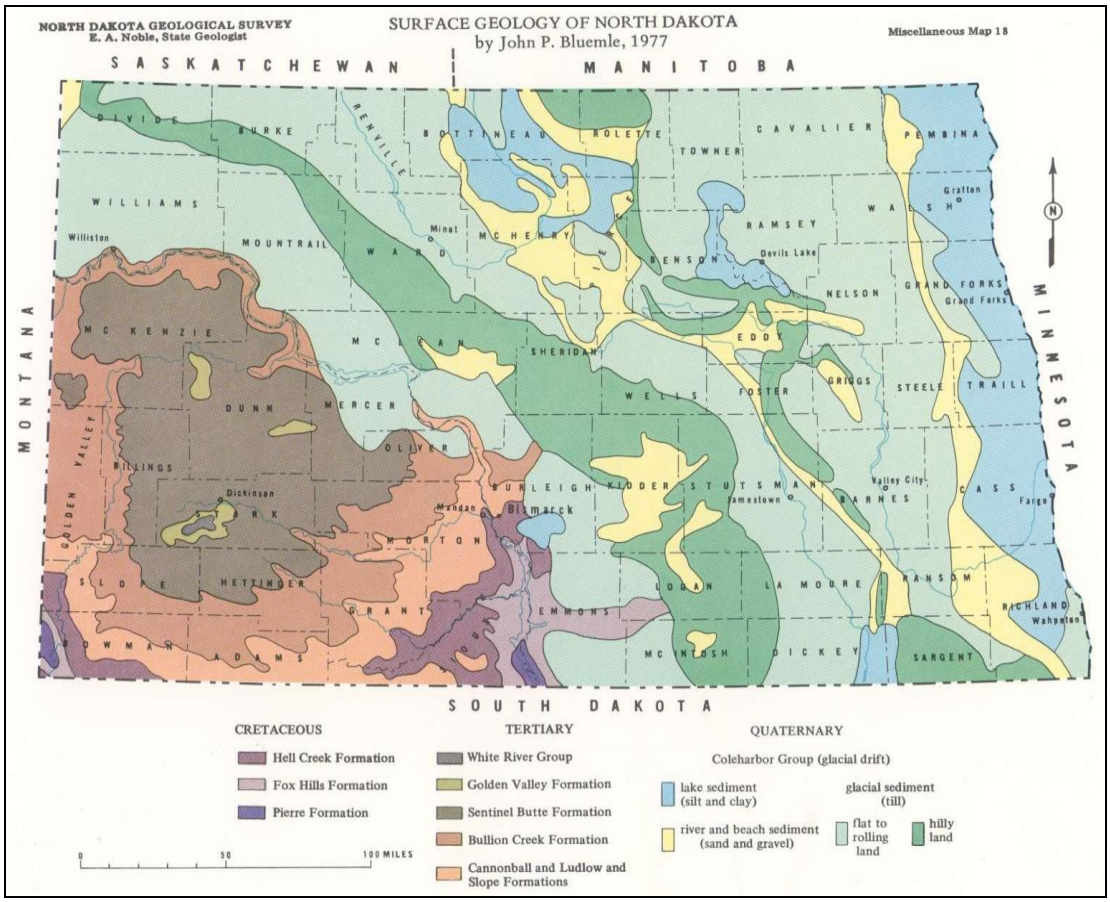
Figure 1.4D Glacial Deposit Formation



Source: Hans Hillewart, 2014

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

Figure 1.4E North Dakota Surface Geology



Source: North Dakota Geological Survey, 2014

Figure 1.4F below depicts Nelson County's geological formations. Land use today is influenced by these geological formations.

Figure 1.4F, Nelson County Surface Geology Source: North Dakota Geological Survey, 2014

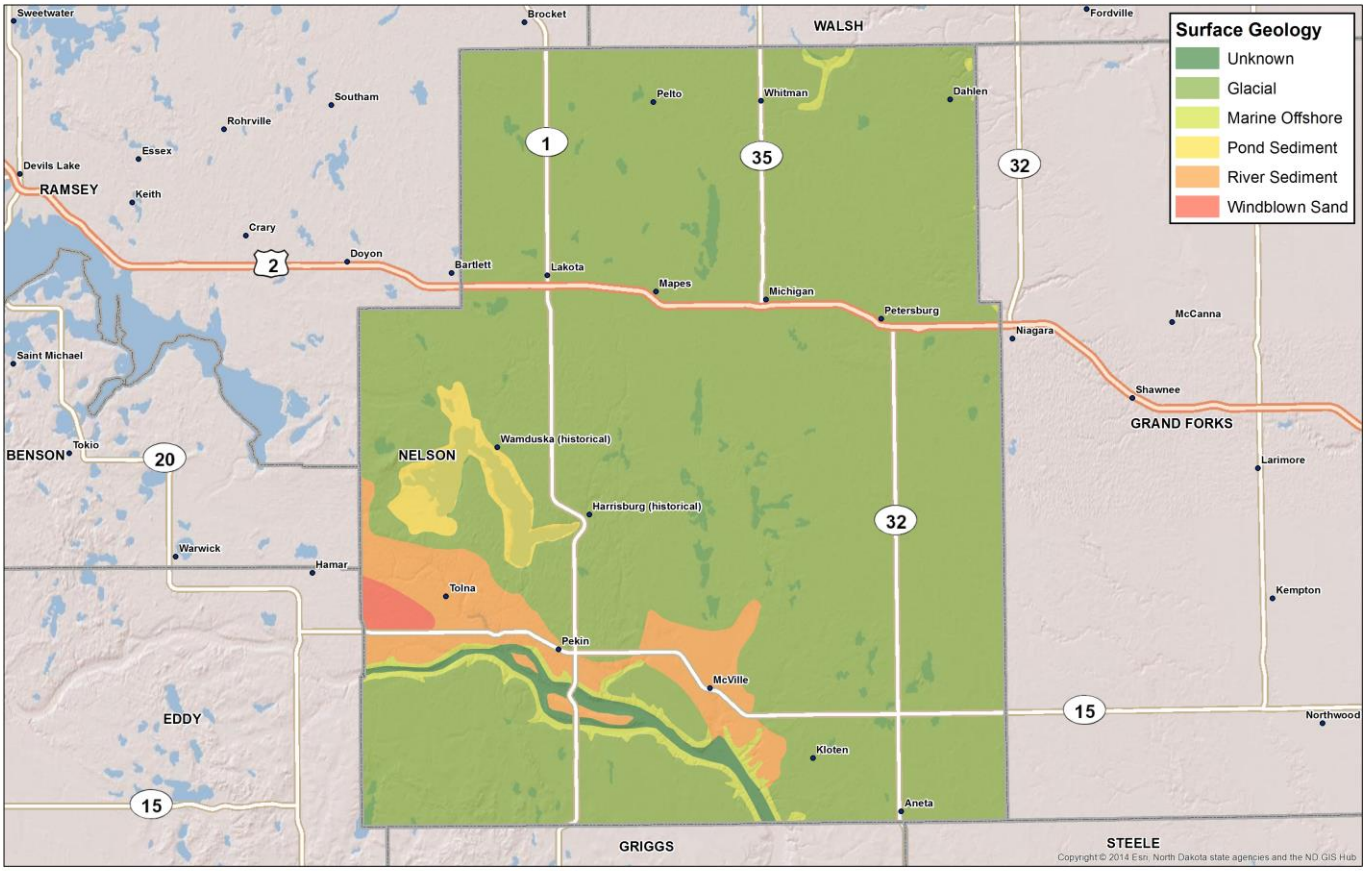
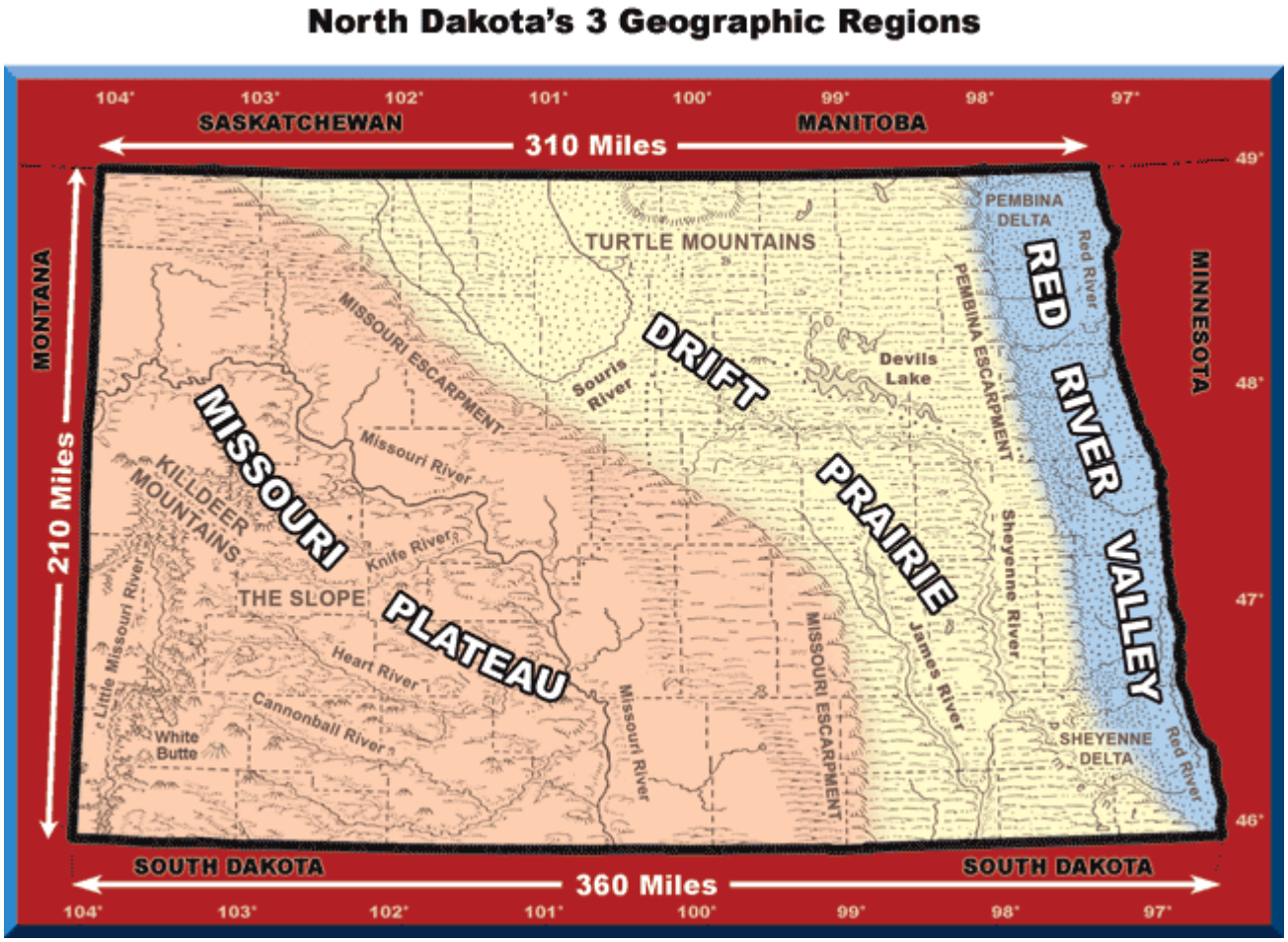


Figure 1.4.G, North Dakota's Geological Regions



http://ndstudies.gov/legendary_maps_charts

Nelson County in northeast North Dakota is just west of the soil-rich Red River Valley, thus the county is in the 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.

Glacial drift covers the entire area except along a few deeply eroded valleys where Cretaceous shale is exposed. The glacial drift reaches a maximum thickness of over 300 feet in the McVille trench of southern Nelson County. Nelson County is in the Red River of the North drainage basin. Perennial drainage is mainly southeastward via the Goose and Sheyenne Rivers in Nelson County. All other streams in the two counties are intermittent. Nelson County is part of the Hudson Bay drainage versus the western part of the state that is the Gulf of Mexico drainage.
Source: http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubContentPDF/PB-311/NelsonWalsh_Part_1.pdf

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 Nelson County. Nelson 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. (National Weather Service, 2014)

Latitude is not the only factor that affects the climate of Nelson 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 artic air to slide east of the Rockies onto the Great Plains (including Nelson County) giving Nelson County cold winter temperatures. (National Weather Service, 2014)

Temperature

Nelson County truly represents a continental climate with cold winters and hot summers. Summers are warm and pleasant with warm days and cool nights. Mean temperature in July in McVille is only recorded as 69.2 with the mean temperature in January at 6.9 degrees Fahrenheit. The highest recorded temperature according to the National Weather Service is 102 degrees Fahrenheit on August 4, 1947 and repeated on September 6, 1978. However Multi-Hazard Mitigation Planning Committee members reported a record high of 106 degrees Fahrenheit in July, 2006 in McVille. The record low temperature set for Nelson County is -44 degrees Fahrenheit set on February 2, 1996. The record high temperature for North Dakota is held by Steele, the Kidder County Seat. The record is 121 degrees Fahrenheit set on July 6, 1936 while the record low for North Dakota was -60 degrees Fahrenheit on February 15, 1936. Source: National Weather Service - http://www.crh.noaa.gov/bis/ and http://www.crh.noaa.gov/fgf/

Precipitation

Nelson County's average annual precipitation is 21.74 inches resulting in a semi-aired climate, however a Multi-Hazard Committee member who has been keeping precipitation records reported that the average annual precipitation for Petersburg is 24 inches. 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 .49 inches of precipitation while June typically is the wettest with 3.76 inches of precipitation. http://ggweather.com/normals/ND.html#M – McVille.

The wettest year was 1985 when Nelson County received 29.69 inches versus the driest year on record was 1936 when 7.94 inches of precipitation fell. Source: National Weather Service - http://www.crh.noaa.gov/fgf/

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 wind gust recorded was at Tolna when a thunderstorm wind gust of 81 mph was recorded. The strongest non-thunderstorm wind is 76 mph recorded on November 1, 1999. Source: National Weather Service - http://www.crh.noaa.gov/fgf/

Climate Conclusion
Nelson 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 Nelson 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.

TABLE 1.4.2A, MONTHLY CLIMATE SUMARY FOR PETERSBURG

Period of Record : 6/12/1930 to 2/28/2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	13.3	19.1	31.4	50.2	65.0	74.0	79.7	79.0	68.0	54.5	33.8	18.9	48.9
Average Min. Temperature (F)	-6.5	-1.4	12.3	28.5	40.4	50.7	55.3	53.0	42.8	31.2	15.9	0.6	26.9
Average Total Precipitation (in.)	0.54	0.42	0.74	1.15	2.27	3.38	2.94	2.54	1.99	1.37	0.69	0.51	18.56
Average Total SnowFall (in.)	7.5	5.8	6.4	2.6	0.6	0.0	0.0	0.0	0.1	1.9	5.6	6.8	37.3
Average Snow Depth (in.)	7	9	3	0	0	0	0	0	0	0	1	3	2

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

1.5 County History

Nelson County was created by the 1883 territorial legislature and named for Nelson E. Nelson of Pembina (1830-1913), legislator during that session. He recorded the first homestead in Nelson County. The local government was organized on June 9, 1883. The county seat was chosen as Lakota in 1883 and it still remains the county seat today.

Prior to the white settlement of Nelson County the land was occupied by the nomadic tribe of the Dakota which are commonly known as Sioux or Dakota Sioux, but the correct name is Lakota, and the fuller name is Teton Lakota. The word Sioux is probably from the old Chippewa word for "enemies to the west." The Dakota were originally a great nation, having three dialects and seven major bands or council fires. To most non-Indians, the Dakota are the classic example of the Plains Indian warriors. By the mid to late 1800s, after obtaining horses and guns, they became mighty warriors, driving out all tribes before them and earning the respect of the whites due to their mastery of military tactics and war.

James M. Howard owned the land that became the town site of Lakota. The town site was dedicated on July 27, 1883, one year after Howard, on July 11,1882, acquired, by power of attorney, control of the Indian scrip covering the land that became Lakota. http://www.lakota-nd.com/

Some immigrants had come to the Lakota area before the railroad was built. Once the railroad was built in 1883 more immigrants started coming to Lakota. In September of 1883 the Larimore Pioneer announced that Mr. Hubby, Lakota, expected 60 immigrant families in the spring. In April, 1900, the news noted that Lakota seemed to be receiving its share of immigrants with three to four cars unloading daily. A car usually carried one immigrant family and their possessions. Many settlers kept coming to this area for the broad expanse of fertile land, natural scenery and healthful climate.

With rumors that the railroad would be built from Aneta to Devils Lake, a man named David Newton Tallman became an important person to Tolna. He was born January 22, 1872 in Millbrook, N.Y. and raised there. David graduated from Union College, Schenectady, N.Y. and came to Willmar, Minn. in 1893. He married Clara Larson in 1894 and they had five daughters. Mr. Tallman was employed with the Great Northern Railroad and later had a position in a local bank. Tallman organized the Dakota Development Co., which developed town sites along the Great Northern Railroad in North Dakota. His association with James J. Hill, Empire railroad builder, led to large interests in banks that were created in the towns. The Tallman Invest Co. of which he was president and treasurer was formed and a large number of banks were established in North Dakota, Minnesota, and Montana to assist in placing farm loans.

One of the towns of special interest to Mr. Tallman was Tolna. This name was a coined form of 'Tallman' who platted the town. Unique to Tolna is that Mr. Tallman named its streets after his daughters; Helen, Esther, Gertrude, Margaret, and Marjorie. He also owned the quarter section of land the town of Tolna was built on. The quarter section of land the town was built on is Sections 10 & 11, Township 150, Range 61, Nelson County. On May 8th, 1906, the town was surveyed. On May 25, 1906 the town site was open for sale, and the building of the town began. http://www.cityoftolna.com/history.htm

The country surrounding McVille was settled in the early 1880's. In 1906 McVille was relocated to its present location with the coming of the Great Northern Railway. McVille rates among the oldest settled sections of ND outside of the Red River Valley. http://www.mcville.com/history.htm

Michigan, North Dakota was established in 1883 with the establishment of its post office on January 2, 1883 with C.J. Bondurant as postmaster. W.S. Fowler was appointed on February 23, 1883 as postmaster. Shortly after the post office was established a carload of iron ore intended for Michigan City, Indiana arrived on the tracks in Dakota. To avoid any further error, Michigan City was listed as just Michigan on

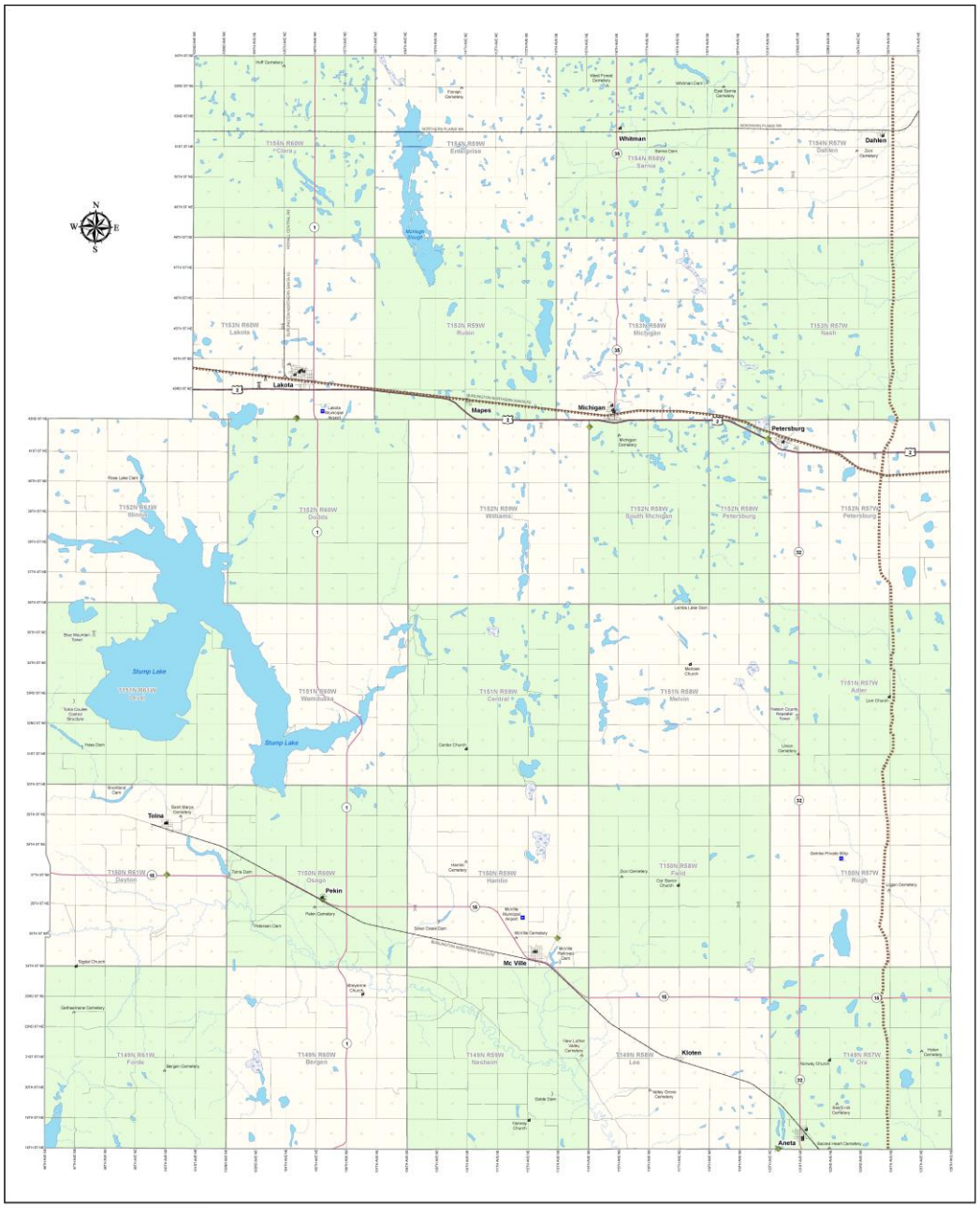
railroad billings and timetables. Michigan was first plotted in May 1883, lots were sold and many businesses established. http://www.michigannd.com/

Although the history of many small towns begins with the railroad, the worst rail disaster in North Dakota history happened in Nelson County at 7:20 p.m. on August 9th in 1945 at Michigan. The first section of a Great Northern passenger train had to make an emergency stop, and the engine of section-two plowed into it from behind resulting in 34 deaths and numerous injuries.

The two Empire Builders were traveling to the West Coast as a pair. The first section contained the Pullman sleeper cars, with 237 aboard, and the second section carried between 600 and 700 in coach cars. A new crew came on at Fargo that afternoon, with section-one leaving at 3:25 and section two pulling out about 10 minutes later. Passengers were almost all military men and women – World War II was winding down and would, in fact, officially end within the week. http://www.michigannd.com/

Today, Nelson County is served by two railroads companies and four railroad lines. The Burlington Northern Santa Fe runs its main line through North Dakota from Grand Forks to Williston. This line is a freight route and a passenger route providing AMTRAK service with the closest Amtrak station in Devils Lake, 26 miles west of Lakota. This line parallels US Highway 2. A branch route west of Lakota runs to the North for about four miles. Another Burlington Northern Santa Fe freight line enters Nelson County at Aneta and runs about one-quarter mile west of Tolna. The second railroad is the Northern Plains Railroad which runs on the original Soo Line which is a subsidiary of the Canadian Pacific Railroad. The Northern Plains Railroad serves the northern part of the County hauling agricultural products to out of state markets. The map below outlines the rail lines.

Figure 1.5A Nelson County Railroad Map


Legend
Airport
Cemetery
Church
Communication Towers
Dams
Pipelines
Railroad
Substations
Roads
US Highway
State Highway
Rural & City
Ponds and Lakes
Lake or Pond
Marsh or Wetland
Rivers and Streams
Intermittent Streams
Perennial Streams
Township
Township
Section Line
Nelson County, ND
0 1.25 2.5 5 Miles
1:62,500
Lambert Conformal Conic Projection
KLJ

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 Nelson 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 Nelson County understand the hazards better and become more disaster resistant.

2. PLANNING PROCESS AND METHODOLOGIES

Mitigation planning is a community effort. It also takes time and expertise. For Nelson County and the Cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna, an effective hazard mitigation plan requires input from a variety of stakeholders, including elected officials, first 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 Nelson 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
   Nelson 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, all jurisdictions share the same commitment to developing a plan to reduce risks from hazards in their 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 guides that process. Invited to serve on the Planning Team were representatives of the County Commission, representatives of the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna; township representatives, representatives of the fire departments: Aneta, Dahlen, Lakota,

McVille, Michigan, Pekin, Petersburg and Tolna; Michigan, Aneta, Lakota, and McVille Ambulance Services and Tolna Quick Response ; Nelson County Emergency Manager/Nelson County School Superintendent, Nelson County Agent, Nelson County Public Health, Nelson County Risk Manager, Nelson County Sheriff, Nelson County Tax Equalization Director, Nelson County Water Board, Nelson County Weed Board, National Weather Service, Emergency Managers from neighboring counties of Ramsey, Walsh, Griggs, Benson, Eddy, Steele and Grand Forks; Nelson County Health Systems; Polar Communications, MidContinent Communications, NoDak Electric Cooperative, and Otter Tail Power Company. 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 consulted with them during the planning process on planning topics as necessary. The Nelson County Emergency Manager discussed the planning process at the Northeast Emergency Manager Meetings conducted by the North Dakota Department of Emergency Services Regional Coordinator and sought input from neighboring county emergency managers. In addition, the consultant e-mailed each of the emergency managers of the neighboring counties including Ramsey, Walsh, Griggs, Benson, Eddy, Steele and Grand Forks Counties inviting them to the planning meetings and seeking plan input (See Appendix B). There was no response to the request.

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. 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 was the Local Emergency Operations Plan as other plans such as the Economic Development Plan were considered to be out of date. 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.

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 Nelson 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 Nelson 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 Nelson County Commission was responsible for approving and adopting the 2015 Hazard Mitigation Plan Update. The County Commission reviewed and approved the Plan Revision on June 4, 2015.

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

- Aneta
- Lakota
- McVille

- Michigan
- Pekin
- Petersburg
- Tolna

Adoption documentation is available in Appendix F.

2.2 Initial Planning Process

Mitigation planning in Nelson County has always been a priority of Nelson County citizens and officials. The devastating winter storms of 1996/1997 followed by the devastating flood of 1997 raised the hazard mitigation priority. The initial hazard mitigation plan was developed which formalized the Nelson County's hazard mitigation process. Since that time, multiple revisions have been made to the county's mitigation plan. The last plan was formally submitted to and approved by the North Dakota Division of Emergency Management and the Federal Emergency Management Agency (FEMA) in 2010.

Team members invited to participate in the hazard mitigation planning process included all incorporated cities plus Nelson County Highway Department, Nelson County Water Board, and the US Department of Agriculture's Natural Resource Conservation Service (NRCS). Mitigation was specifically discussed at county commission meetings, applicant briefings, 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 local newspapers 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 2015 included the following:

- There were four public meetings in Nelson County where the public was invited through personal letters, newspaper articles, Facebook postings, e-mails, and meeting postings on the county website. The meetings were held on July 30, 2014, September 17, 2014, November 12, 2014, and December 17, 2014. Copies of these invitations are in Appendix B.
- In some cases more detail was needed on specific items beyond the information shared at the meetings. The emergency manager and the consultant conducted private meetings with the Sheriff, the Chairman of the Water District, the Road Superintendent, the County Public Health Administrator, and the County Auditor.

2.3 Plan Update Process

In 2014, Nelson County, through a Hazard Mitigation Grant Program grant, (DR-4118, 3-P) hired a consultant to facilitate the required five-year plan update. Wenck Associates, Inc., in 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 Nelson 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
Nelson County	Sharon Young	syoung@nd.gov	County Emergency Manager
Nelson County	Jaima Curry	curryjaima@gmail.com	County LEPC
Nelson County	Ron Miller	millertme2@gmail.com	County LEPC & Nelson Hwy Dept
Nelson County	Janet Tweed	deewt@gondtc.com	County LEPC & EMS
Nelson County	Lori Ternquist	altern@polarcomm.com	County LEPC
Nelson County	Don Fougner	none	County Commission
Nelson County	Dan Marquart	Danmarquart52@gmail.com	County Commission
Nelson County	Keith Olson	keiolson@nd.gov	County Sheriff
Nelson County	Bruce Ellertson	bellertson@nodakmutual.com	County Commission
Nelson County	Julie Ferry	jferry@nd.gov	County Public Health
Nelson County	Tim Lee	timlee.nelsoncounty@yahoo.com	County Road Supt
Nelson County	Mark Opoien	mopoien@nelsoncountyhealthsystem.org	Nelson County Health System Hospital
Nelson County	Maynard Loibl	loibl@stellarnet.com	County Commission
Nelson County	Ben Varnson	benvarnson@yahoo.com	Water Resource District
Nelson County	Marvin Narum	debbienarum@polarcomm.com	Township Officers Association
Aneta	Todd Whitman	none	Aneta City Mayor
Lakota	Amie Vasichek	lakotact@polarcomm.com	Lakota City Auditor
Lakota	Ed Pawlikowski	eddyp@polarcomm.com	Lakota City Mayor
Lakota	Jason Sorlien	jasonsorlien@polarcomm.com	Lakota Fire Department
Lakota	Rich Riely	rriely@nd.gov	Lakota Fire Department
McVille	Renae Arneson	Mcvillend.gondtc.com	McVille City Auditor
McVille	Joanne Brennan	mcville@gondtc.com	McVille City Deputy Auditor
McVille	Doug Stein	dstein@gondtc.com	McVille City Mayor
Michigan	Lauri Rysavy	frysavy@polarcomm.com	Michigan City Mayor

Michigan	Diane Schock	dms@polarcomm.com	Michigan City Council & EMS
Michigan	John Steffan	steffarm@polarcomm.com	Michigan Fire Department
Pekin	Duane Avdem	dandkavdem@stellarnet.com	Pekin Fire Chief
Pekin	Steve Johnston	none	Pekin City Council
Pekin	Marvin Massey	none	Pekin City Council
Petersburg	Milt Schmidt	mhs@polarcomm.com	Petersburg City Mayor
Petersburg	Herbert Schultz	none	Citizen
Tolna	Vicky Engen	Engen5@gondtc.com	Tolna City Auditor
Tolna	Steve Dahl	sldahl@gondtc.com	Tolna City Council

Table 2.3B Public Meetings

Jurisdiction	Date
Nelson County Hazard Mitigation Plan, Kick-Off Meeting	July 30, 2014
Nelson County Hazard Mitigation Plan, Planning Meeting	August 15, 2014
Nelson County Hazard Mitigation Plan, Planning Meeting	September 17, 2014
Nelson County Hazard Mitigation Plan, Planning Meeting	November 12, 2014
Nelson County Hazard Mitigation Plan, Planning Meeting	December 17, 2014

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 2014 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 2014 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	Information Provided
Local Emergency Operations Plan		Hazard Analysis and Risk Assessment
Devils Lake/Stump Lake Risk Assessment	September 29, 2011	Hazard Analysis and Risk Assessment
Enbridge Emergency Response Plan	June, 2011	Hazard Analysis and Risk Assessment, Emergency Response Information
Keystone Pipeline Emergency Information Book	October, 2009	Hazard Analysis and Risk Assessment, Emergency Response Information

Nelson County Terrorism Annex	July 2004	Hazard Analysis and Risk Assessment
Whitman Dam Emergency Action Plan	October 2011	Hazard Analysis and Risk Assessment, Emergency Response Information
Tolna Dam Emergency Action Plan	September 2011	Hazard Analysis and Risk Assessment, Emergency Response Information
Stump Lake Park Master Plan	May 2009	Hazard Analysis and Risk Assessment, Emergency Response Information
Lakota School Security Plan	2013	Hazard Analysis and Risk Assessment, Emergency Response Information
Dakota Prairie School Emergency Plan	2011	Hazard Analysis and Risk Assessment, Emergency Response Information
Assessment for Stump Lake & Tolna Coulee	January 2007	Hazard Analysis and Risk Assessment
Devils Lake and Stump Lake Outlet Study	October 2009	Hazard Analysis and Risk Assessment
Devils Lake Basin Water Management Plan	2009	Hazard Analysis and Risk Assessment
Nelson County NFIP Study	February 2009	Hazard Analysis and Risk Assessment
Stump Lake Flood Study	2003	Hazard Analysis and Risk Assessment
Nelson County Evacuation/Shelter-in-Place Annex	January 2008	Hazard Analysis and Risk Assessment, Emergency Response Information
Sheltering & Mass Care Annex	January 2008	Hazard Analysis and Risk Assessment, Emergency Response Information
Nelson County Wildfire Mitigation Plan	2004	Hazard Analysis and Risk Assessment, Emergency Response Information

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 2010 plan; extraneous information was removed or placed in the appropriate new section.
- Updates and improvements to all sections of the previous plan.

- 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 Nelson County Website from dates of March 16 through April 2, 2015. In addition the emergency had a paper copy of the draft plan in the courthouse for people to come in and review. Each section was reviewed individually by hazard experts, stakeholders, and members of the community.

The Nelson 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

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

Auditor / Risk Manager

The following have different job descriptions yet are combined in Nelson County.
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 and various county boards. 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.

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.

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 Courts / Recorder
The following have different job descriptions yet are combined in Nelson County.
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 Nelson County: Administration, Civil, Criminal, and Juvenile.

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.

Coroner
The role of the Coroner includes coordination of services to confirm and certify the deaths of an individual in Nelson 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 Nelson County. The Coroner's office maintains death records of those who have died within Nelson County.

County Commissioners
The Board of County Commissioners serves as the elected ruling body of the county government structure. The Nelson County Commission is made up of five members and typically meet once a month or as the need arises may call special meetings as determined by the commission. Commissioners in Nelson 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 / Superintendent of Schools

The following have different job descriptions yet are combined in Nelson County.
The Nelson County Emergency Manager has the responsibilities for the day-to-day emergency management programs. The Emergency Management Office cooperates with a comprehensive network of local, state, and federal Emergency Management personnel, governmental agencies, law enforcement, fire, ambulance, and other emergency personnel, private businesses, voluntary organizations and individuals to identify potential hazards and to apply the four phases of Emergency Management (Mitigation, Preparedness, Response, and Recovery) to develop emergency plans for each potential natural and technological hazards.

The Emergency Manager helps increase local emergency response capabilites by coordinating trainings and exercises, managing Homeland Security grants, and obtaining equipment and resources needed to meet disaster response requirements.

The Superintendent's duties fill students' lives with educational activities they will long remember, including spelling bees, MATHCOUNTS, and other local and state contests. Superintendents plan and conduct workshops for the training of school bus drivers. They assist teachers and administrators and provide information on school law and legislative matters. The County Superintendent of Schools assumes the primary responsibility in restructuring school district boundaries.

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 Nelson County (NDSU) agents strive to have the Nelson County (NDSU) Extension Service be the premier lifelong education network that helps Nelson County Citizens improve their quality of life. The agents develop educational resources to address the issues and needs of Nelson County citizens.

Highway Superintendent
Most county citizens benefit from the work of the Highway Superintendent, who is responsible for the counties' roads and bridges. He runs the county shop and all its activities and equipment, and work with engineering and construction firms on planning and providing for the transportation needs of county.

Nelson County 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. The Deputy Auditor is the overseer and contact of Weed Board Activities.

Public Health

This is combined with Griggs County.

Nelson County Public Health provides personal and population based health services to residents in Nelson 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 Mosquito Control.

School Districts

Nelson County has two school districts, Lakota and Dakota Prairie. They provide K-12 education for 444 Nelson County students. Dakota Prairie 2014 enrollment had 137 in grades K through 6 and 119 students in grades 7th through 12th for a total of 256 students. Lakota 2014 enrollment had 91 in grades K through 6 and 97 students in grades 7th through 12th for a total of 188 students. Students living near the Nelson County border may attend schools in the neighboring districts of Northwood, Larimore, Finley-Sharon, Midkota, Warwick, Griggs County Central, or Fordville-Lankin.

Sheriff

The Sheriff's duties include making arrests, enforcing all state and local laws, maintaining jail facilities, 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, Nelson 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 State's Attorney provides guidance to county commissioners and officials in interpreting the meaning of the North Dakota Century Code and legislation.

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.

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
Nelson County has 27 unincorporated 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 and zoning.

Water Resource Board
The primary responsibility of the Water Resource Board is to provide effective management of Nelson County's water resources. The vision is that present and future generations of Nelson 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. They also participate on the Sheyenne River Joint Board, Upper Sheyenne River Joint Board, Red River Joint Water Resource Board, and Devils Lake Joint Board.

911 Communications
The 911 Communications in Nelson County is coordinated by the 911 Coordinator. This position keeps the addresses and telephone numbers updated in a database for identification of 911 calls. Nelson County uses the Devils Lake Public Safety Answering Point as its dispatch center in the City of Devils Lake. There is a State Radio tower in Nelson County. The dispatch centers receive 9-1-1 calls generated from Nelson 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. Update and exercise emergency operations and mitigation plans.
    d. Coordinate state sponsored training for county agencies including law enforcement, public health, social services, fire departments, emergency medical services, etc.
    e. Coordinate the county's Local Emergency Planning Committee.
    f. Coordinate the county's Tier Two reporting (hazardous materials)
    g. Conduct public awareness and educational programs via newspapers, radio, and schools to decrease vulnerability to hazards.
    h. Work with schools and local businesses to help create site specific hazard response plans and present in-service education to local business employees.
    i. Responsible for timely and effective public information releases during emergency situations.
    j. During a disaster declaration, emergency management has all county resources at their disposal including manpower, communications, and equipment.
    k. With effective planning, training, and exercising, emergency management can help to mitigate potential hazards within the county.
    l. 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: Nelson County Emergency Management coordinates with appropriate local agencies to ensure preparedness, response, recovery, and mitigation. These agencies include Nelson County Commissioners, Nelson County District Health, Nelson County Road Department, Nelson County Sheriff's Department, and various other law enforcement, fire, communication, and emergency medical agencies.
   b. Non-local Agencies: Nelson 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. Nelson 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 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 Nelson 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: Nelson County Emergency Management and Nelson 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. Nelson County Highway Department should assist local government with floodplain management and water development permitting.

Planning Director

The mitigation actions of the County Planner have multiple roles including enforcing the County Zoning Resolution to enforce flood plain ordinances and stormwater management regulations. In Nelson County, the Planning Director is the county appointed representative by the County Commission.

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, Nelson 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. Nelson 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, Nelson County Public Health coordinates with the following local agencies: Nelson 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, Nelson 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 Nelson 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: Nelson County shares resources with Griggs County, 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.

Risk Management

Primarily a safety position the Risk Management director can keep county officials safe by monitoring areas of risk and eliminating the risk through mitigation actions.

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

Sheriff's Department

1. Mitigation 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 911 emergency operations through its communications division.
   c. Provide standard law enforcement manpower and equipment.
   d. In disaster situations, provide warning, rescue assistance, evacuation assistance, security, traffic control, and information assistance.
   e. Coordinate the necessary resources to obtain a dive rescue team.
   f. Provide public awareness and educational programs such as 911 education, safe kids program, etc.
   g. 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. <u>Local Agencies:</u> Within the scope of law enforcement, the Nelson County Sheriff's Department coordinates with various local agencies. These agencies include Nelson County Emergency Management and various local police departments.
   b. <u>Non-local Agencies:</u> Nelson 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, and Federal Bureau of Investigation.

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 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.

Superintendent of Schools
The mitigation responsibilities of the Superintendent of Schools 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.

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 dispersement of hazard mitigation funds.

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 Resource 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.

Other Agency Resources

Mitigation and risk reduction.

Aneta Fire Department: General fire suppression, rescue, 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.

Dahlen Fire Department: General fire suppression, rescue, 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.

Lakota Fire Department: General fire suppression, rescue, 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.

McVille Fire Department: General fire suppression, rescue, 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.

MIchigan Fire Department: General fire suppression, rescue, 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.

Niagara Fire Department: General fire suppression, rescue, 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.

Pekin Fire Department: General fire suppression, rescue, 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.

Petersburg Fire Department: General fire suppression, rescue, 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.

Tolna Fire Department: General fire suppression, rescue, 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.

Nelson County Health System(McVille): Emergency response, patient care, transport, and public awareness and continuing education programs.
Lakota Ambulance: Emergency response, patient care, transport, and public awareness and continuing education programs.
Michigan Ambulance: Emergency response, patient care, transport, and public awareness and continuing education programs.
Aneta Ambulance: Emergency response, patient care, transport, and public awareness and continuing education programs.
McVille Ambulance: Emergency response, patient care, transport, and public awareness and continuing education programs.
NoDak Electric: Provide engineering expertise, heavy equipment, and damage assessment. (Utilities)
OtterTail Energy: Provide engineering expertise, heavy equipment, and damage assessment. (Utilities)
Lakota Municipal Utilities: Provide electrical power and water to the City of Lakota.
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: Situation and damage assessment; provide transportation resources for movement of state personnel, supplies, and equipment to include air and ground reconnaissance; traffic control.
State Fire Marshal: Hazmat route utilization; hazmat technical assistance; situation and damage assessment.
Devils Lake Public Service Answering Point: Exercise readiness of warning systems and communication support.

2.4.3 Emergency Operations Plan

Nelson 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	**Damage Assessment**	**Administration Functional**	**Public Safety**	**Individual and Family**	**Health and Medical**	**Warning Functional**	**Communications Functional**	**Public Works/Transportation**

Functional Coordinator Chief Elected Official	**Functional Coordinator Tax Equalization**	**Coordinator Auditor**	**Functional Coordinator Sheriff/Chief of Police**	**Assistance Functional Coordinator Human Services**	**Functional Coordinator Health District**	**Coordinator Chief Elected Official**	**Coordinator Sheriff**	**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	Forestry
Fire Departments	Law Enforcement		Auxiliary Groups	Clerk of Court	Pharmacies			Water Treatment
Public Works/Engineering	Fire Departments		Bomb Squad	Veteran's Services	Clinics			Facility Maintenance
Assessor	Emergency Management		Fire Departments		Nursing Homes			Airport Authority
State's Attorney			HazMat Team					Planning
Tax Equalization								

2.5 Risk Assessment Methodologies

A key step in preventing disaster losses in Nelson 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.

This all-hazard risk assessment and mitigation strategy serves as an initial source of hazard information for those in Nelson 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 disasters 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 Nelson County Local Emergency Operations Plan. Additional elements were included during the plan update based on contractor research. Nelson 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	
Highly Likely	Nearly 100% probability in the next year
Likely	10-100% probability in the next year, or at least 1 chance in the next 10 years
Possible	1-10% probability next year, or at least 1 chance in the next 100 years
Unlikely	Less than 1% probability in the next 100 years
MAGNITUDE	
Catastrophic	More than 50% of jurisdiction affected
Critical	25-50% of jurisdiction affected
Limited	10-25% of jurisdiction affected
Negligible	Less than 10% of jurisdiction affected

The Nelson 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 A to D – A is highest)

		IMPACT			
		Negligible	*Limited*	*Critical*	*Catastrophic*
FREQUENCY	*Highly Likely*	**C**	**B**	**A**	**A**
	Likely	**C**	**C**	**B**	**A**
	Possible	**D**	**C**	**B**	**B**
	Unlikely	**D**	**D**	**C**	**C**

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.

C*ritical 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. O*ther 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 hazards 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 2010, the hazards included in the county Multi-Hazard Mitigation Plan were based on those listed in the state's mitigation plan. In 2014, updates to the hazard list reflected those changes made to the state plan. The jurisdictions were also asked if additional hazards 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 Nelson County Hazards

Hazard Profile	Jurisdiction	How Identified	Why Identified
Communicable Disease (including human, animal, and plant diseases)	All jurisdictions	▪ Centers for Disease Control and Prevention ▪ Nelson County Public Health ▪ North Dakota Department of Agriculture ▪ North Dakota Department of Health ▪ Pandemic studies ▪ US Department of Agriculture ▪ World Health Organization	▪ Global disease threat ▪ History of pandemics ▪ Dependence on agricultural economy
Dam Failure	Nelson County	▪ US Army Corps of Engineers ▪ North Dakota State Water Commission	Reports of dam structure issues have been identified.
Drought	All jurisdictions	▪ National Drought Mitigation Center ▪ National Climatic Data Center ▪ National Weather Service ▪ North Dakota State Climate Office ▪ US Department of Agriculture	▪ History of droughts ▪ Importance of agriculture to the local economy ▪ Numerous USDA disaster declarations

Table 2.6A Nelson County Hazards (Continued)

Hazard Profile	Jurisdiction	How Identified	Why Identified
Flood (including riverine, closed basin, ice jam, and flash floods)	All jurisdictions	▪ Cold Regions Research and Engineering Laboratory ▪ Federal Emergency Management Agency ▪ HAZUS-MH ▪ National Climatic Data Center ▪ National Weather Service ▪ US Army Corps of Engineers	▪ Extensive history of severe riverine, closed basin, ice jam, and flash floods
Hazardous Material Release	All jurisdictions	▪ Federal Motor Carrier Safety Administration ▪ National Response Center ▪ North Dakota Department of Emergency Services ▪ North Dakota Department of Health ▪ US Department of Transportation	▪ Regular truck and rail traffic transport goods through the county ▪ Facilities containing hazardous materials exist throughout the county
Homeland Security Incident	All jurisdictions	▪ 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	▪ 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	▪ National Oceanic and Atmospheric Administration ▪ North Dakota Department of Emergency Services ▪ Community input	▪ 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	▪ Federal Emergency Management Agency ▪ National Climatic Data Center ▪ National Weather Service ▪ Storm Prediction Center	▪ Extensive history of tornadoes, hail, downbursts, thunderstorm winds, lightning, and extreme heat

Table 2.6A Nelson County Hazards (continued)

Hazard Profile	Jurisdiction	How Identified	Why Identified
Transportation Accident (including vehicular, railway, and aircraft accidents)	All jurisdictions	▪ Federal Railroad Administration ▪ National Highway Traffic Safety Administration ▪ National Transportation Safety Board ▪ Upper Great Plain Transportation Institute	▪ History of small transportation accidents ▪ Potential for larger transportation accidents causing mass casualties
Urban Fire or Structure Collapse	All jurisdictions	▪ City Fire Departments ▪ National Fire Protection Association ▪ US Fire Administration	▪ History of large urban fires ▪ Potential for structure collapses
Wildland/Rural Fire	All jurisdictions	▪ Center for International Disaster Information ▪ North Dakota Forest Service ▪ Farm Service Agency	▪ 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	▪ National Climatic Data Center ▪ National Weather Service ▪ North Dakota Department of Emergency Services	▪ History of severe winter storms ▪ High probability of blizzards and other potentially damaging storms
Geologic Hazards	All jurisdictions	▪ North Dakota Department of Emergency Services ▪ North Dakota Geological Survey ▪ US Geological Survey	▪ Erosion along the north east side of the Stump Lake Park Pavilion ▪ Potential exists for occasional slumping along rivers
Windstorm	All jurisdictions	▪ Federal Emergency Management Agency ▪ National Climatic Data Center ▪ Storm Prediction Center	▪ 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 and public health offices
- Transportation: bridges and major highways
- Emergency Services: police, fire and dispatch centers
- Communications: major communications towers
- Water: treatment facilities

One data source that was utilized to analyze critical infrastructure/key resources in Nelson 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 Nelson County as having 66 Energy, 6 Public Health, 5 Transportation, 14 Emergency Services, 24 Communications, and Water critical facilities.

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 Nelson County include:

- Building Property (Structure) Value: $24,471,304
- Personal Property (Contents) Value: $4,168,145
- Outdoor Property Value: $3,340,485
- Trailer Property Value: $6,494

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

The North Dakota State Fire and Tornado Fund in 2013 also indicated $13,927 of North Dakota University system property to be located in Nelson County although there is not a university nor research center located within the county.

The State of North Dakota also identifies other state owned properties as critical assets. Nelson County does not have a National Guard yet still has over one million of State owned property within the county of values of:

- Building Property (Structure) Value: $730,533
- Personal Property (Contents) Value: $263,3000
- Outdoor Property Value: $326,115

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 Nelson County: $411,280
- 2013 taxable valuation of pipeline in Nelson County: $4,387,355
- 2013 taxable valuation of electric and gas in Nelson County: $95,519

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

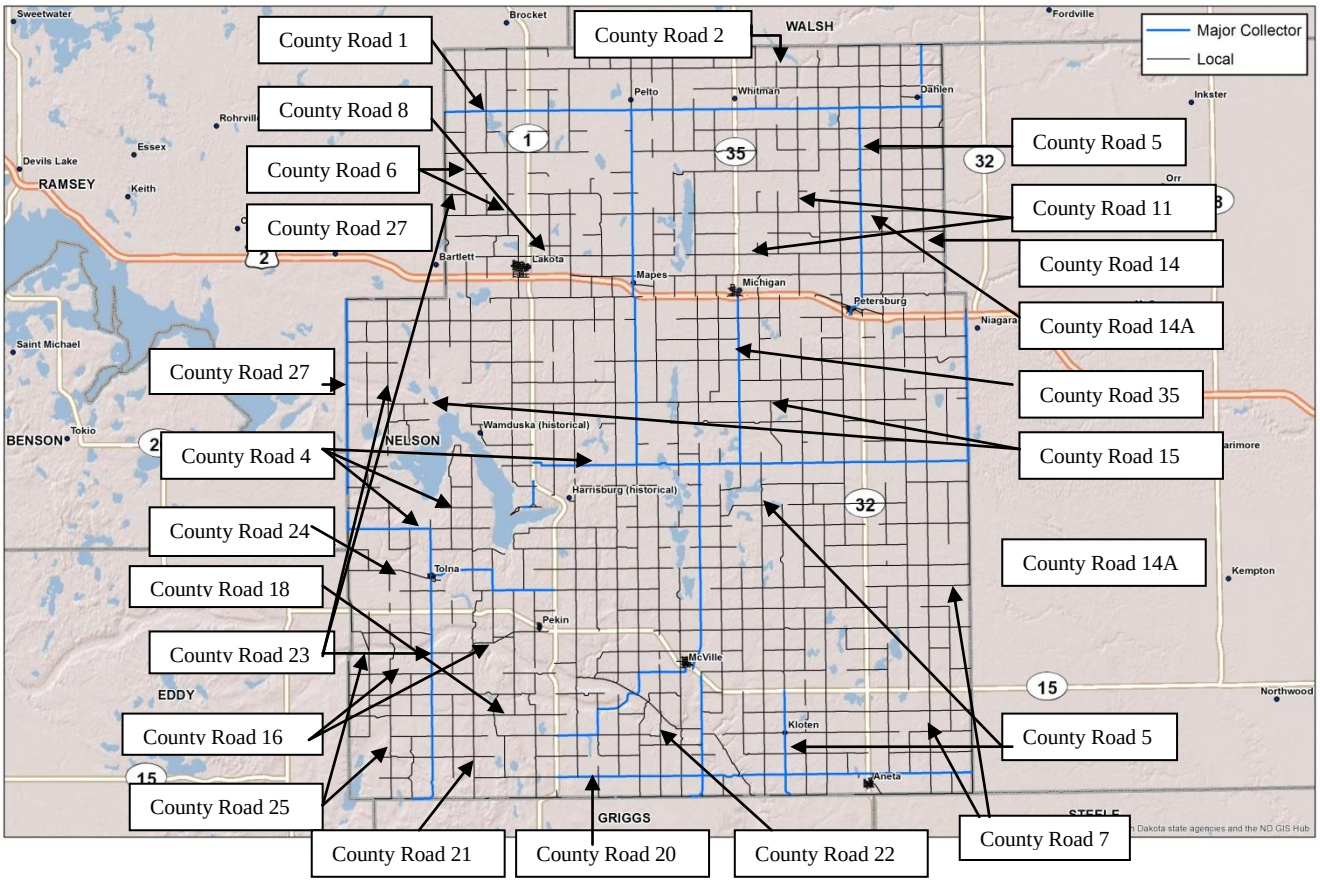
Transportation

Nelson County's main transportation is roads. The county has limited air transportation with two public airports and no commercial airlines. The county does have railroads with both freight and passenger service through Amtrak service. The county and the State of North Dakota are landlocked.

Nelson County has an extensive county and township transportation system linking farms to the city markets and sources of consumer goods. There are 351 miles of gravel roads and 81.6 miles of paved roads in Nelson County. The main county roads and their surface are listed below. These roads are maintained by Nelson County.

Figure 3.1A below shows the Nelson County transportation routes. The County highways are identified; the township roads which are feeder roads to the county system are shown also. Many of the township roads are minimum maintenance roads, used for farmer field access.

Figure 3.1A Nelson County Roads



Source: ND GIS Hub, 2014 and Nelson County

Table 3.1A State and Federal Nelson County Highways (Shown on Figure 3.1A)

Highway	Route Direction
US 2	East/West, Northern Nelson County
ND 1	North/South, Western Nelson County
ND 15	East/West, Southern Nelson County
ND 35	North/South, North Central Nelson County
ND 32	North/South, Eastern Nelson County

Source: North Dakota Department of Transportation, 2014

The development of automobiles and commercial trucks brought about the building of highways in the United States. Nelson County is located just west of a major interstate highway; the county relies heavily on the county road systems. Rural counties like Nelson must balance the great expense of road upkeep and maintenance with other county expenses. Fortunately, the North Dakota Department of Transportation 2013 study has indicated only two county structures to be structural obsolete and two structures to be functionally obsolete. Similarly, the State has only one state bridge with significant scour testing indicating the transportation is being maintained within the county.

Table 3.1C Nelson County Traffic Counts

Highway	Total Traffic Count	Commercial Traffic Count
US 2, West of Lakota	**3520**	**775**
US 2, East of Lakota	**3440**	**690**
US 2 West of Mapes	**3560**	**805**
US 2 East of Mapes	**3365**	**800**
US 2 West of Petersburg	**3365**	**790**
US 2 East of Petersburg	**3255**	**785**
ND 1 South of Lakota	**525**	**110**
ND 1 North of Lakota	**625**	**130**
ND 1 South of Pekin	**370**	**95**
ND 1 North of Pekin	**510**	**110**
ND 15 West of Pekin	**510**	**85**
ND 15 East of Pekin	**550**	**60**
ND 15 West of ND 32 Junction North of Aneta	**470**	**60**
ND 15 East of ND 32 Junction North of Aneta	**540**	**110**

ND 32 South of ND 15 Junction North of Aneta	**530**	**130**
ND 32 North of ND 15 Junction North of Aneta	**150**	**65**
ND 32 @ US 2 Junction South of Petersburg	**205**	**70**
ND 35 @ US 2 Junction North of Michigan	**290**	**30**

Source: North Dakota Department of Transportation, 2010

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. Sugar beets, small grain, potato and corn harvest times can cause severe road damage as heavy farm trucks move the harvested crops to storage or markets.

Nelson County also has two public airports at Lakota and McVille. In addition there are three private airstrips.

Figure 3.1B, Public Airports

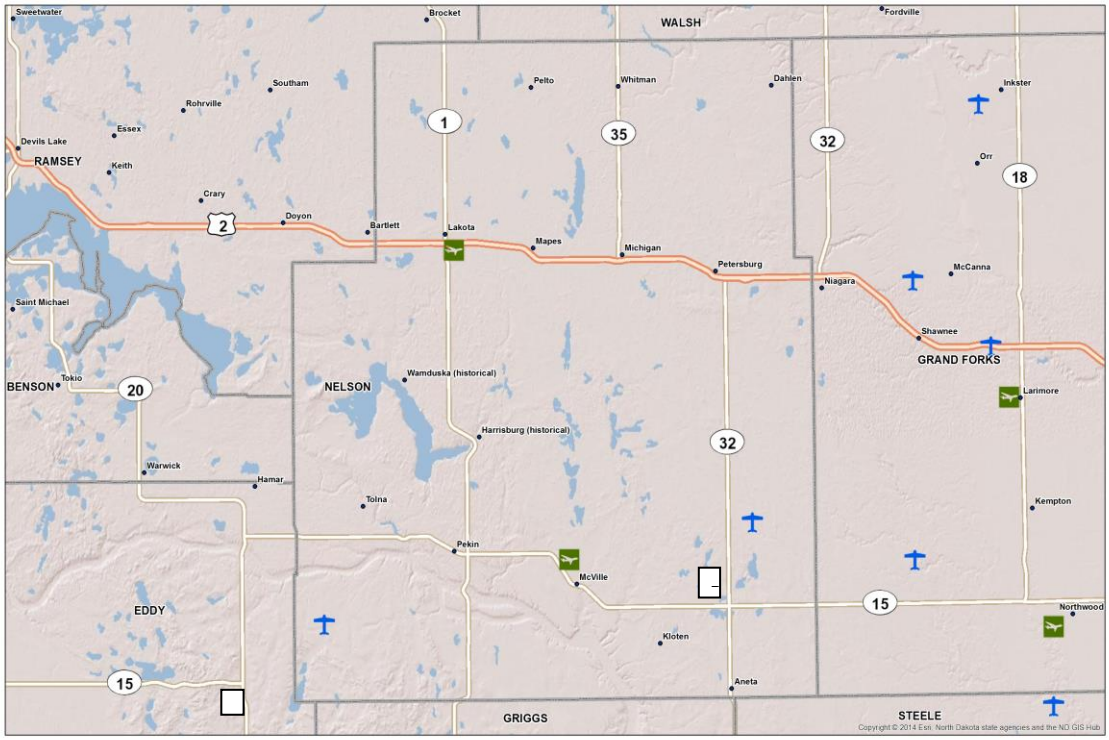
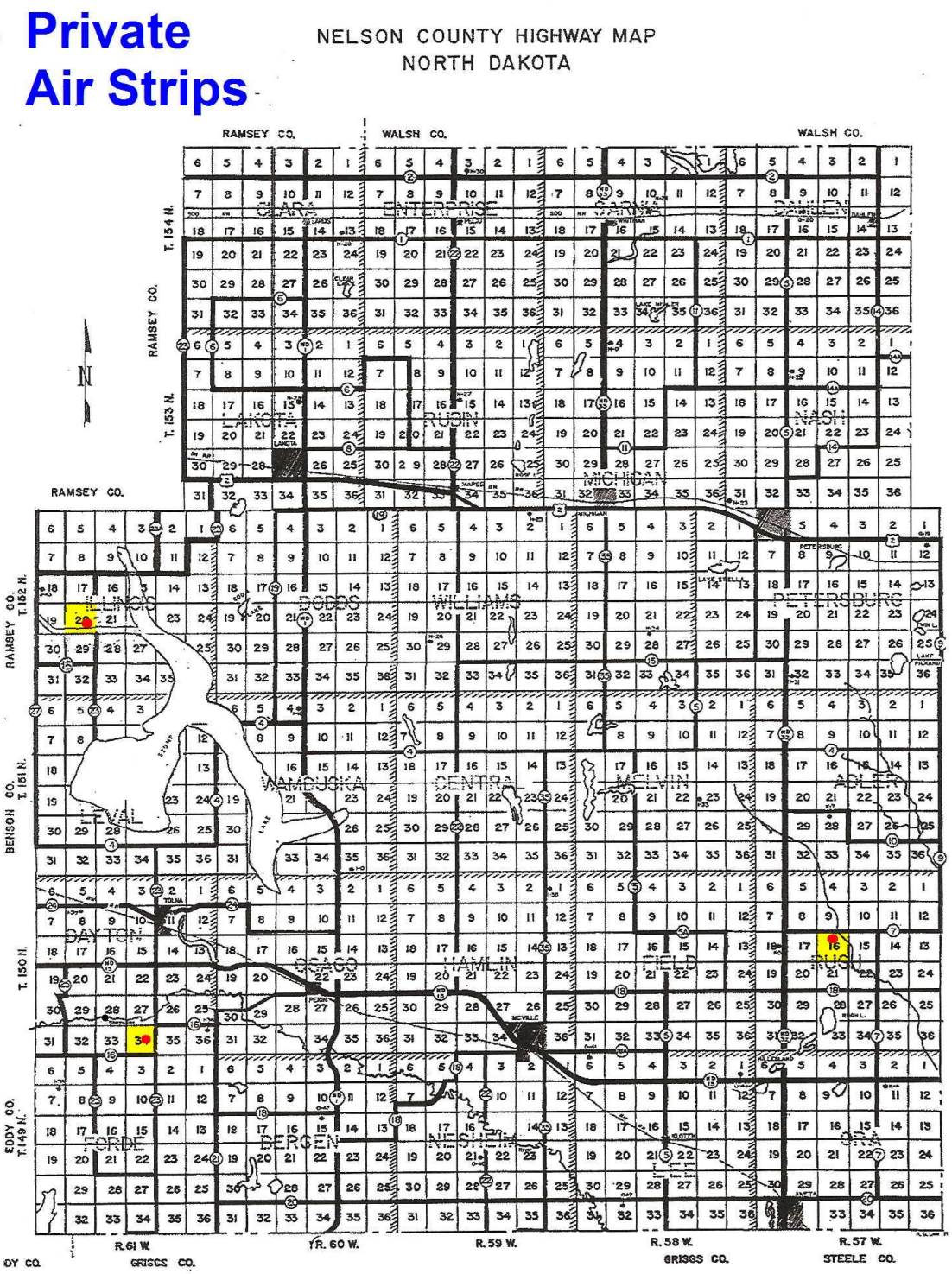


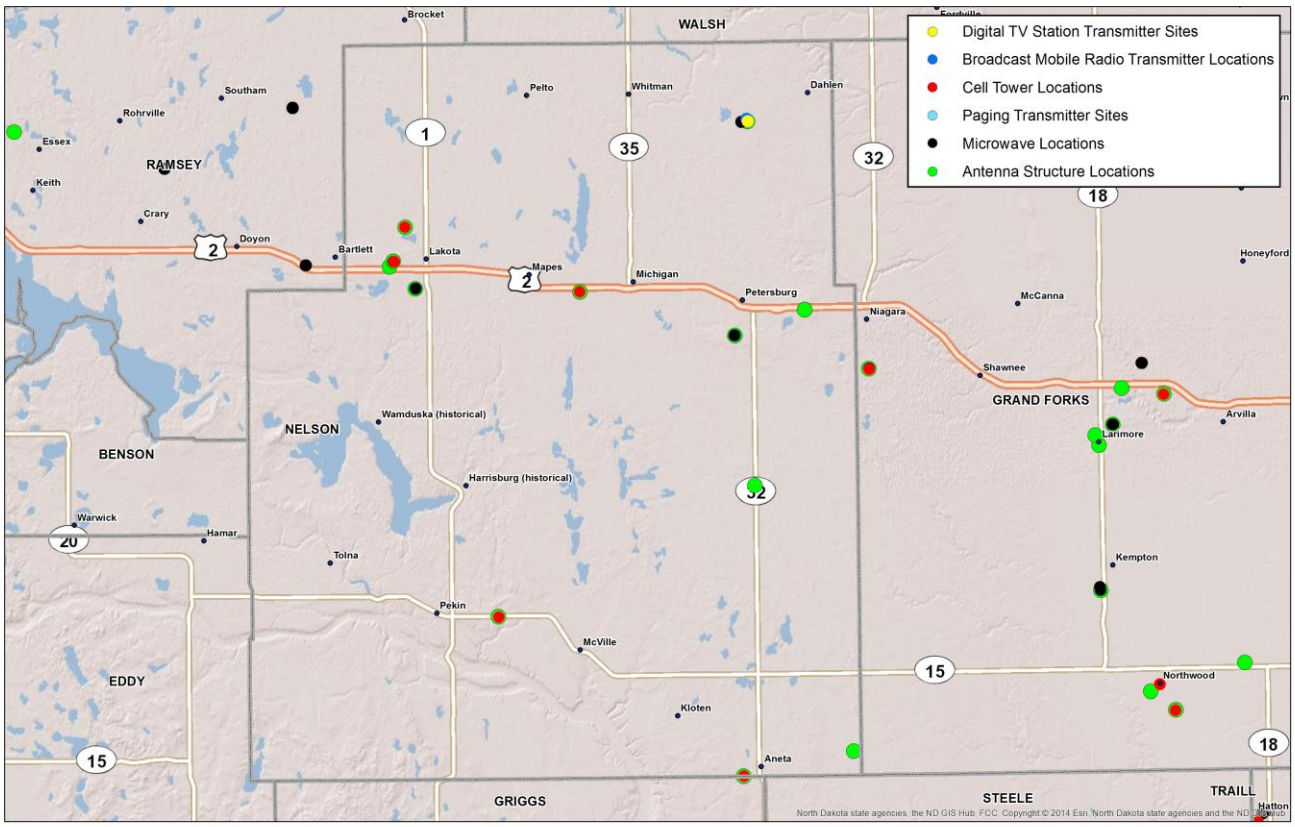
Figure 3.1C, Private Air Strips



Communication Towers

The figure below shows the communication towers located in Nelson 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. First 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. The County does have a State Radio tower that assists with the overall State Communication plan.

Figure 3.1D Nelson County Communication Towers



Source: ND GIS Hub, 2014

Heating Sources

During the cold winter months, the heating of homes and businesses is a necessity. Residents of Nelson 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 2008-2012 in Nelson County by home heating fuel type:

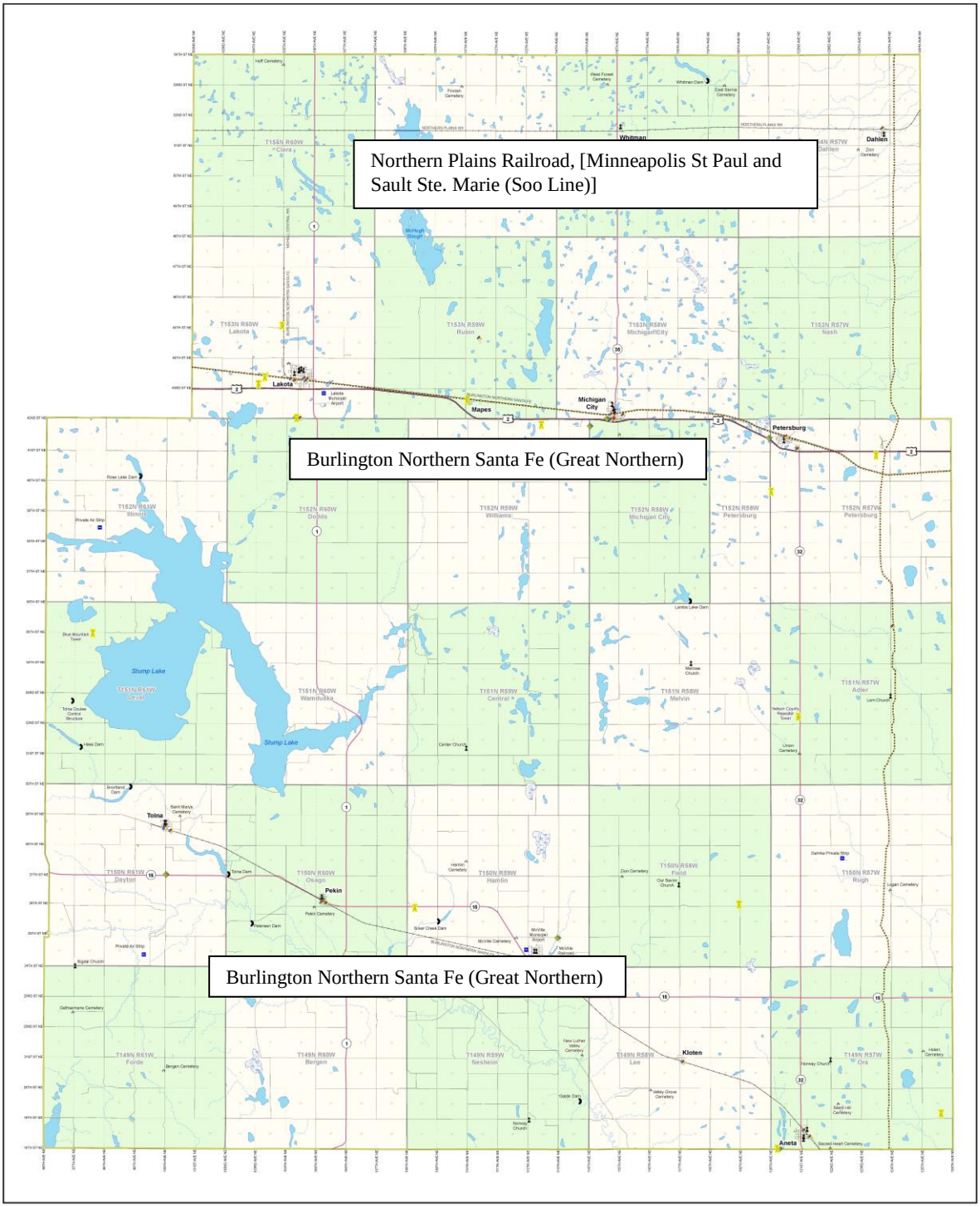
- Utility gas: 29
- Bottled, tank, or LP gas: 284
- Electricity: 724
- Fuel oil, kerosene, etc.:372
- Coal or coke: 0
- Wood:3
- Solar energy: 0
- Other fuel: 4
- No fuel:27

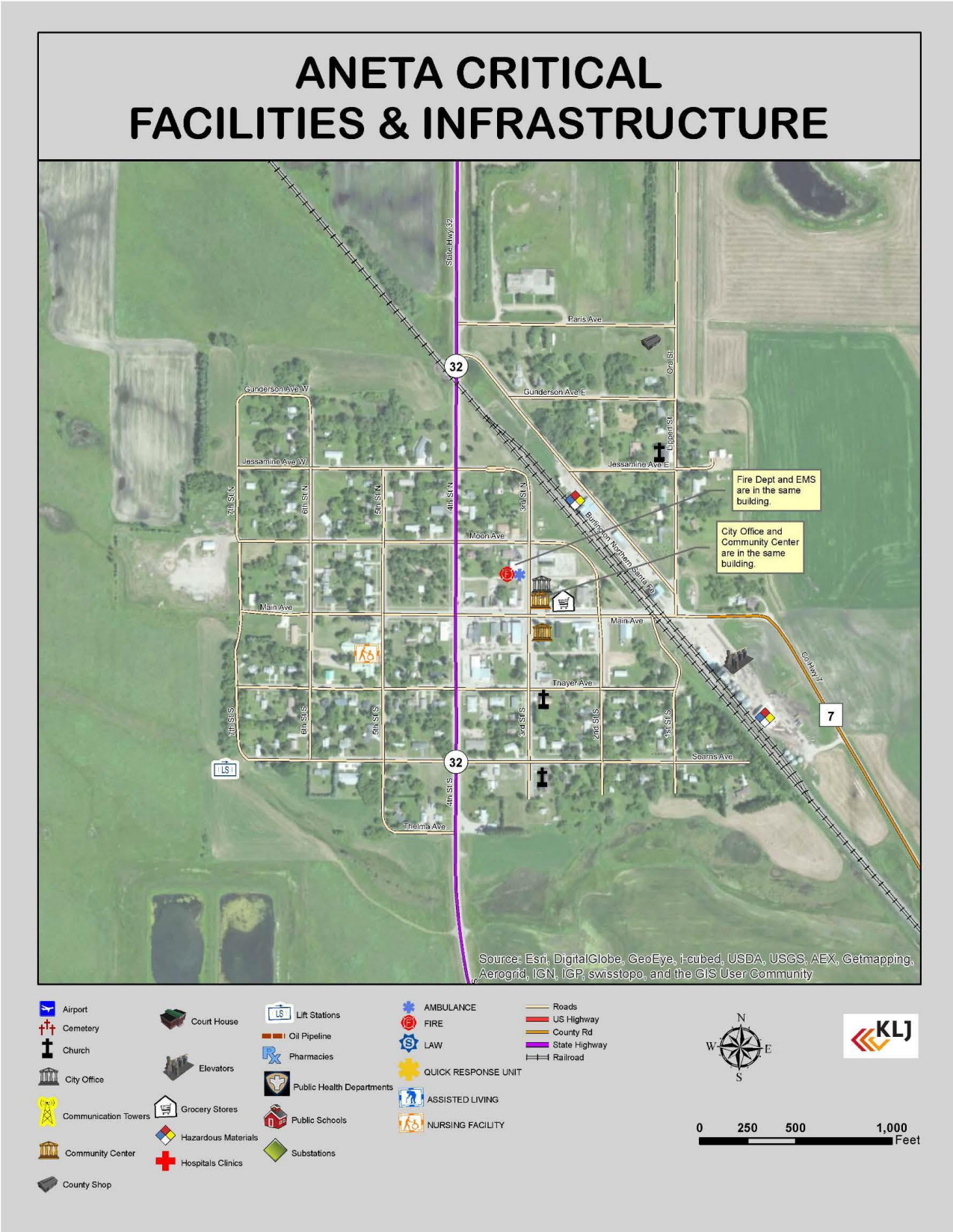
Source: US Census Bureau, 2008-2012 American Community Survey

Critical Facilities

Each jurisdiction identified its own critical facilities and infrastructure as part of the Local Emergency Operations Plan development. Those facilities are shown in Figure 3.1D, Critical Facilities, by jurisdiction.

Figure 3.1E, Critical Facilities Including Railroad Routes

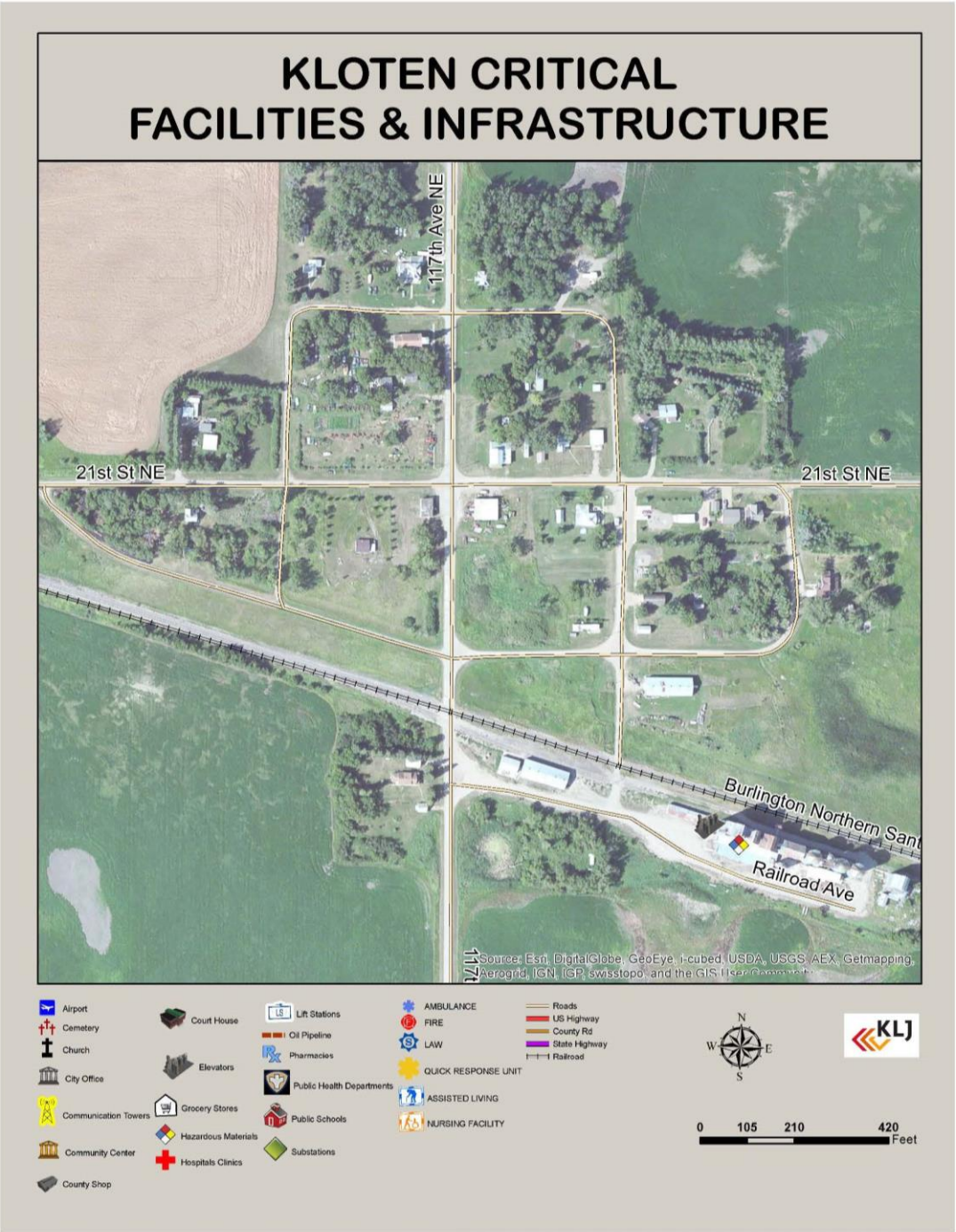

Northern Plains Railroad, [Minneapolis St Paul and Sault Ste. Marie (Soo Line)]
Burlington Northern Santa Fe (Great Northern)
Burlington Northern Santa Fe (Great Northern)
Lakota
Mapes
Michigan City
Petersburg
Whitman
Dahlen
Tolna
Pekin
Kloten
Aneta
Stump Lake
Legend
Airport
Cemetery
Church
Communication Towers
Dams
Hazardous Materials
Pipelines
Substations
Wind Turbine
Ponds and Lakes
Lake or Pond
Marsh or Wetland
Rivers and Streams
Intermittent Streams
Perennial Streams
Roads
US Highway
State Highway
Rural & City
Railroad
County Boundary
Section Line
Township
Nelson County, ND
0 1.25 2.5 5 Miles
1:62,500
Lambert Conformal Conic Projection
N
W
E
S
KLJ


ANETA CRITICAL
FACILITIES & INFRASTRUCTURE
State Hwy 32
Paris Ave
Gunderson Ave W
Gunderson Ave E
Jessamine Ave W
Jessamine Ave E
Moon Ave
Main Ave
Thayer Ave
Searns Ave
Thelma Ave
Burlington Northern Santa Fe
Co Hwy 7
Fire Dept and EMS are in the same building.
City Office and Community Center are in the same building.
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
W
E
S
KLJ
0 250 500 1,000 Feet

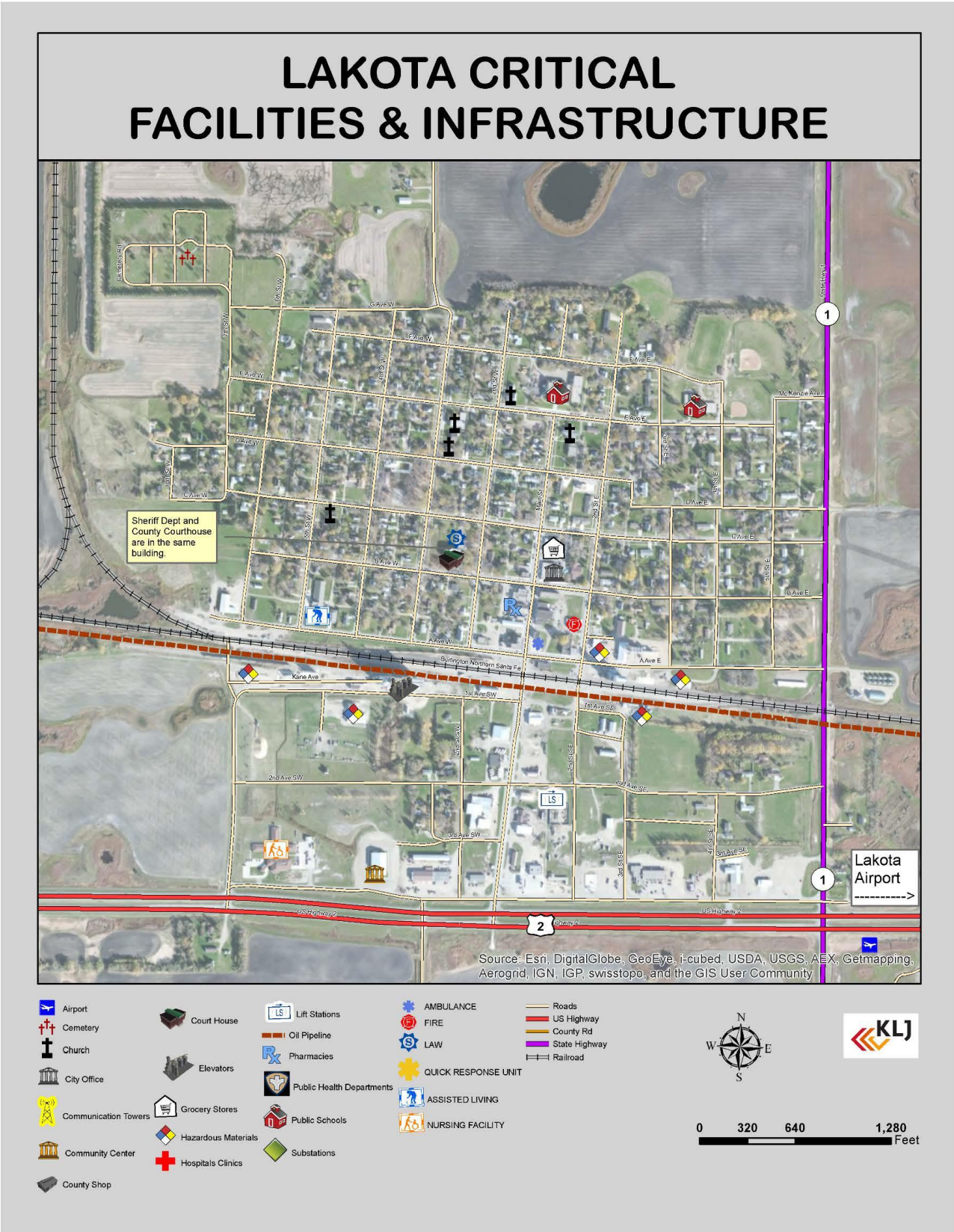
FACILITY	ADDRESS	COMMUNITY	CATEGORY
ANETA PARKVIEW HEALTH CENTER	113 5TH STREET S	ANETA	ASSISTED LIVING OR NURSING FACILITY
COMMUNITY CHURCH	204 3RD ST S	ANETA	CHURCH
SACRED HEART CATHOLIC CHURCH	307 1ST ST N	ANETA	CHURCH
SUNDAHL LUTHERAN CHURCH	304 3RD ST S	ANETA	CHURCH
ANETA CITY OFFICE	219 MAIN AVE	ANETA	CITY OFFICE
COUNTY SHOP-ANETA	PARIS AVE & ORA ST	ANETA	COUNTY SHOP
CHS, INC MCVILLE-ANETA	223 BN DRIVE	ANETA	ELEVATOR
SPICERS GROCERY	213 MAIN AVE	ANETA	FOOD & LIVING ESSENTIALS
LIFT STATION	301 7TH ST S	ANETA	LIFT STATION
ANETA COMM CENTER	219 MAIN AVE	ANETA	PLACE FOR GATHERING
ANETA AUDITORIUM	220 MAIN AVE	ANETA	PLACE FOR GATHERING
ANETA FIRE	117 3RD ST N	ANETA	RESPONDERS
ANETA AMBULANCE	117 3RD ST N	ANETA	RESPONDERS
CENTRAL PLAINS AG SERVICES- ANETA	223 BN DR	ANETA	TIER II FACILITIES
CHS, INC MCVILLE-ANETA	223 BN DR	ANETA	TIER II FACILITIES

DAHLEN CRITICAL
FACILITIES & INFRASTRUCTURE
1st Ave
1st Ave
Poplar St
Main St
2nd Ave
Willow St
Maple St
3rd Ave
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
W
E
S
KLJ
0 105 210 420
Feet

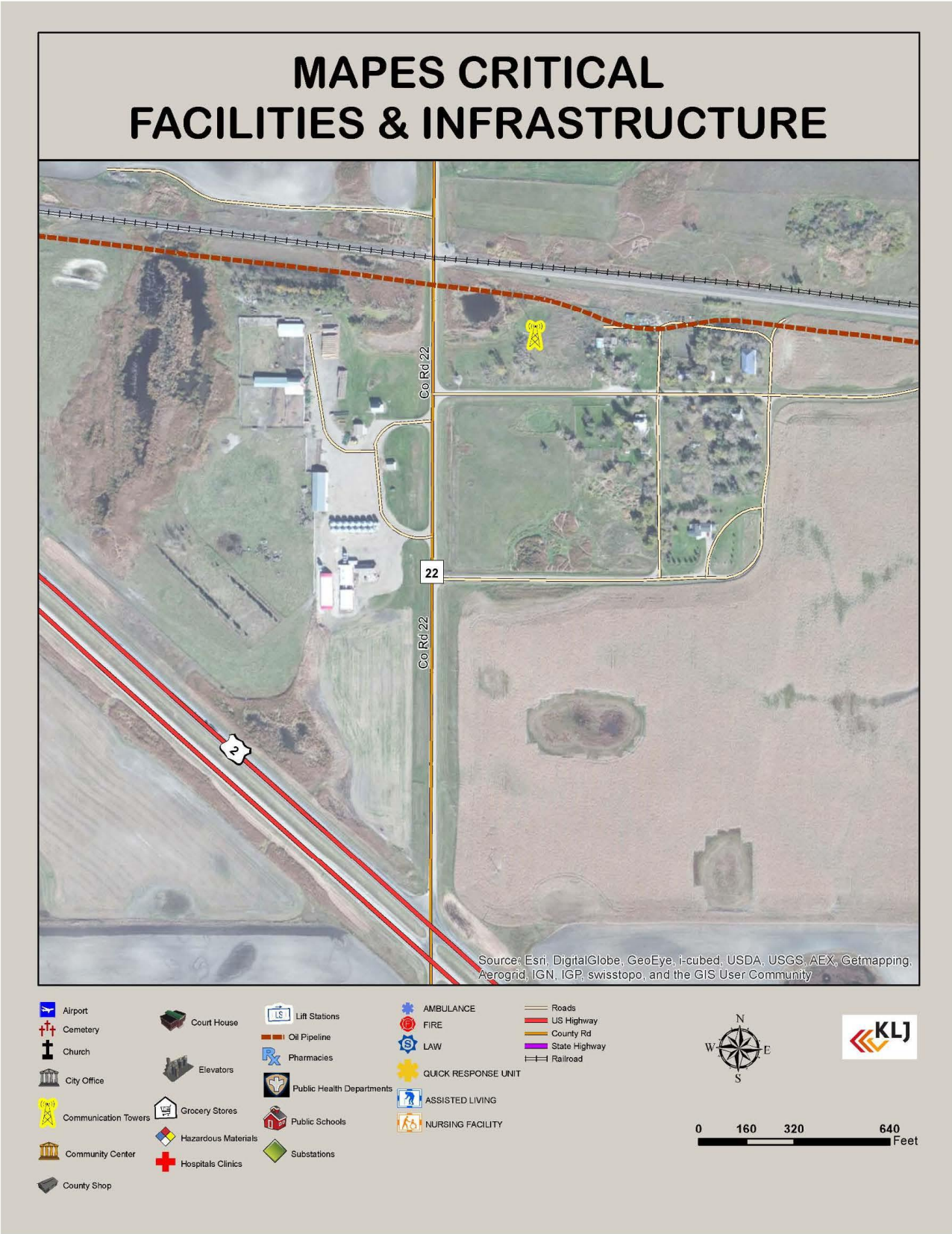
FACILITY	ADDRESS	COMMUNITY	CATEGORY
DAHLEN LUTHERAN CHURCH	206 MAIN ST S	DAHLEN	CHURCH
DAHLEN FARMERS ELEVATOR & OIL CO	218 N MAIN ST	DAHLEN	ELEVATOR
DAHLEN FRIENDSHIP ROOM	120 MAIN ST	DAHLEN	PLACE FOR GATHERING
DAHLEN COMMUNITY HALL	MAIN ST & 1ST AVE W	DAHLEN	PLACE FOR GATHERING
DAHLEN RURAL FIRE	120 MAIN ST N	DAHLEN	RESPONDERS
DAHLEN FARMERS ELEVATOR & OIL CO	218 N MAIN ST	DAHLEN	TIER II FACILITIES



FACILITY	ADDRESS	COMMUNITY	CATEGORY
CHS MCVILLE-KLOTEN	RAILROAD AVE	KLOTEN	ELEVATOR
CHS-MCVILLE-KLOTEN	RAILROAD AVE	KLOTEN	TIER II FACILITIES

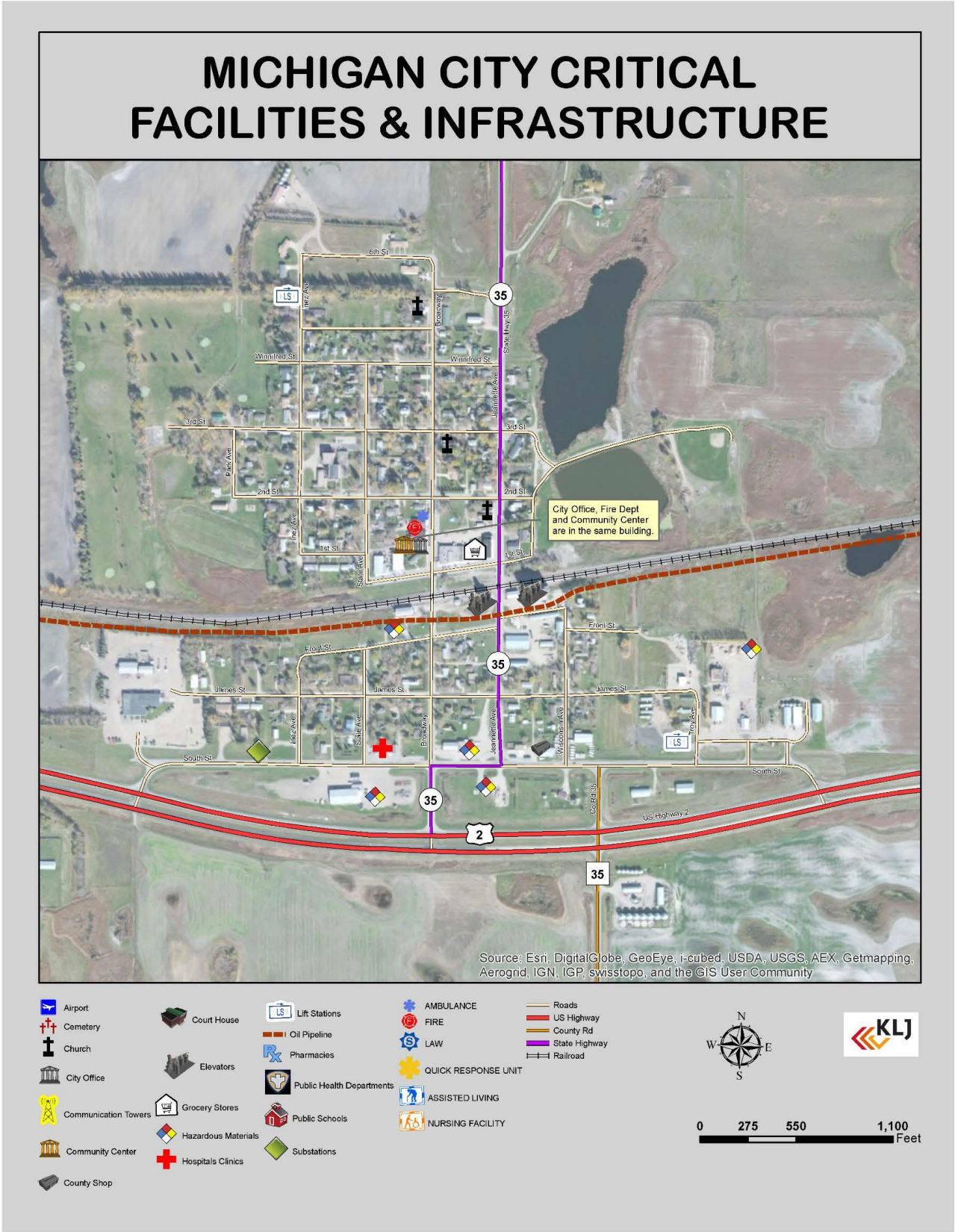

LAKOTA CRITICAL
FACILITIES & INFRASTRUCTURE
Sheriff Dept and County Courthouse are in the same building.
Lakota Airport
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
S
E
W
KLJ
0 320 640 1,280
Feet

FACILITY	ADDRESS	COMMUNITY	CATEGORY
LAKOTA MUNICIPAL AIRPORT	10620 US HIGHWAY 2	LAKOTA	AIRPORT
LAKOTA CONGREGATE HOUSING - PRAIRIE ROSE	102 5TH ST W	LAKOTA	ASSISTED LIVING OR NURSING FACILITY
GOOD SAMARITAN SOCIETY - LAKOTA	608 4TH AVE SW	LAKOTA	ASSISTED LIVING OR NURSING FACILITY
LAKOTA CEMETERY	NW LAKOTA	LAKOTA	CEMETERY
LAKOTA LUTHERAN CHURCH	416 3RD ST W	LAKOTA	CHURCH
ST MARY'S CHURCH	410 MAIN ST N	LAKOTA	CHURCH
UNITED CHURCH OF CHRIST	116 E AVE W	LAKOTA	CHURCH
EPISCOPAL CHURCH OF THE GOOD SHEPHERD	216 D AVE W	LAKOTA	CHURCH
GRACE LUTHERAN CHURCH	415 C AVE W	LAKOTA	CHURCH
LAKOTA CITY OFFICE	108 B AVE E	LAKOTA	CITY OFFICE
NELSON COUNTY COURT HOUSE	210 B AVE W	LAKOTA	COURT HOUSE
CHS, INC - LAKE REGION	301 FIRST AVE SW	LAKOTA	ELEVATOR
WIMERS SUPER MARKET	216 MAIN ST N	LAKOTA	FOOD & LIVING ESSENTIALS
LIFT STATION	2ND ST SE & 2ND AVE SW	LAKOTA	LIFT STATION
LAKOTA DRUG AND GIFT	117 MAIN ST N	LAKOTA	PHARMACY
LAKOTA COMMUNITY CENTER	404 HWY 2 W	LAKOTA	PLACE FOR GATHERING
NELSON COUNTY SHERIFF	210 B AVE W	LAKOTA	RESPONDERS
LAKOTA FIRE DEPT	107 2ND ST E	LAKOTA	RESPONDERS
LAKOTA AMBULANCE SERVICE	102 MAIN ST N	LAKOTA	RESPONDERS
LAKOTA ELEMENTARY SCHOOL	316 E AVE E	LAKOTA	SCHOOL
LAKOTA HIGH SCHOOL	500 MAIN ST N	LAKOTA	SCHOOL
TRONSON GRAIN, LLC - RT AGRI-SEED	216 A AVE E	LAKOTA	TIER II FACILITIES
CHS, INC. - LAKE REGION	301 FIRST AVE SW	LAKOTA	TIER II FACILITIES
FERRELL GAS	103 2ND ST NE	LAKOTA	TIER II FACILITIES
TRI COUNTY PETROLEUM INC	A AVE E	LAKOTA	TIER II FACILITIES

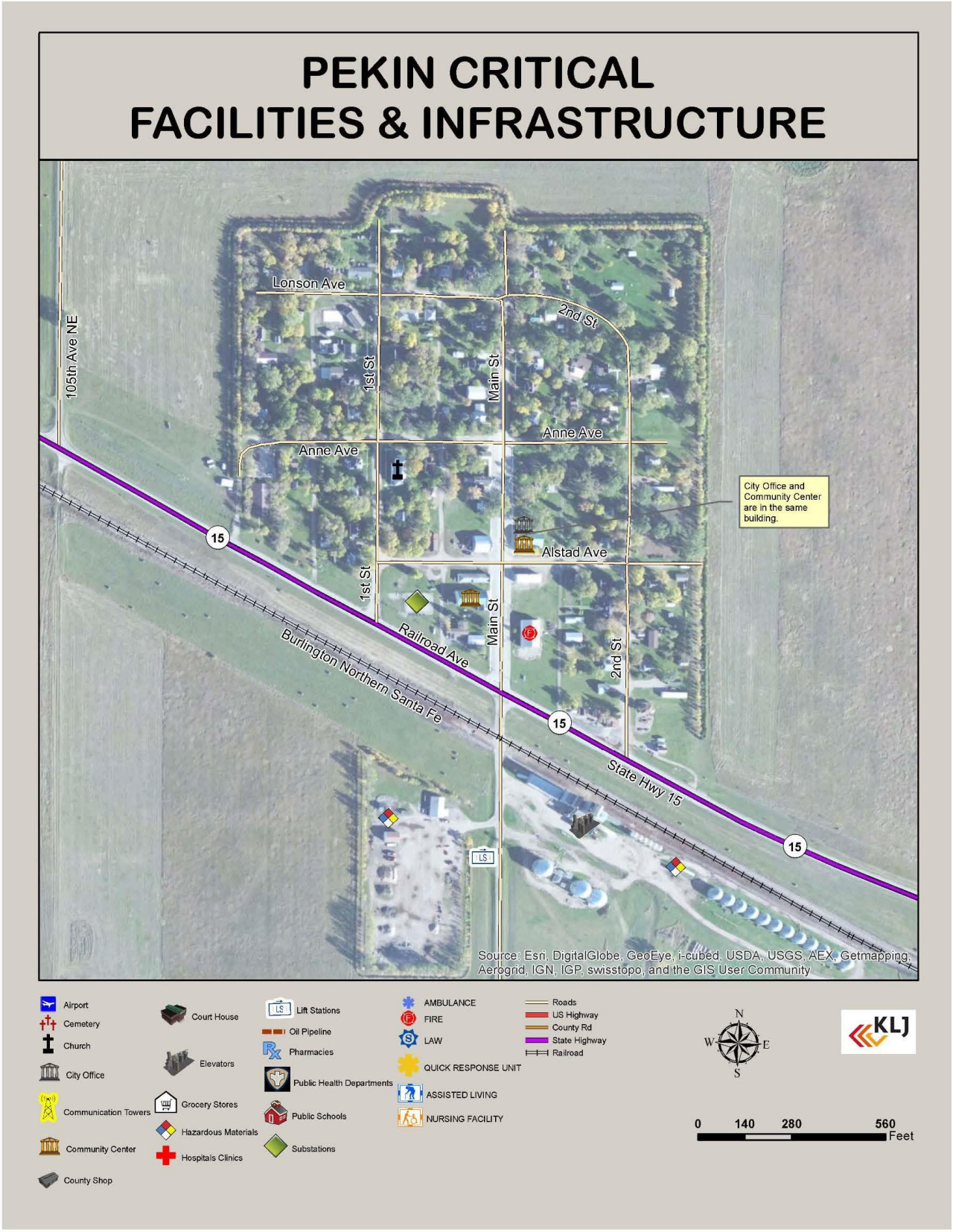

MAPES CRITICAL
FACILITIES & INFRASTRUCTURE
Co Rd 22
22
Co Rd 22
2
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
W
E
S
KLJ
0
160
320
640
Feet

MCVILLE CRITICAL
FACILITIES & INFRASTRUCTURE
Golf Ave
Nyhus Ave
Berwick Ave
Vail Ave
Rogers Ave
W Felton Ave
E Felton Ave
Mc Dougall Ave
State Hwy 15
Main St
Olsgard St
Skyline St
N Lee St
S Lee St
112th Ave NE
N Hamlin St
S Hamlin St
Baldwin St
8th St S
Co Rd 35
15
35
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
W
E
S
KLJ
0 250 500 1,000
Feet

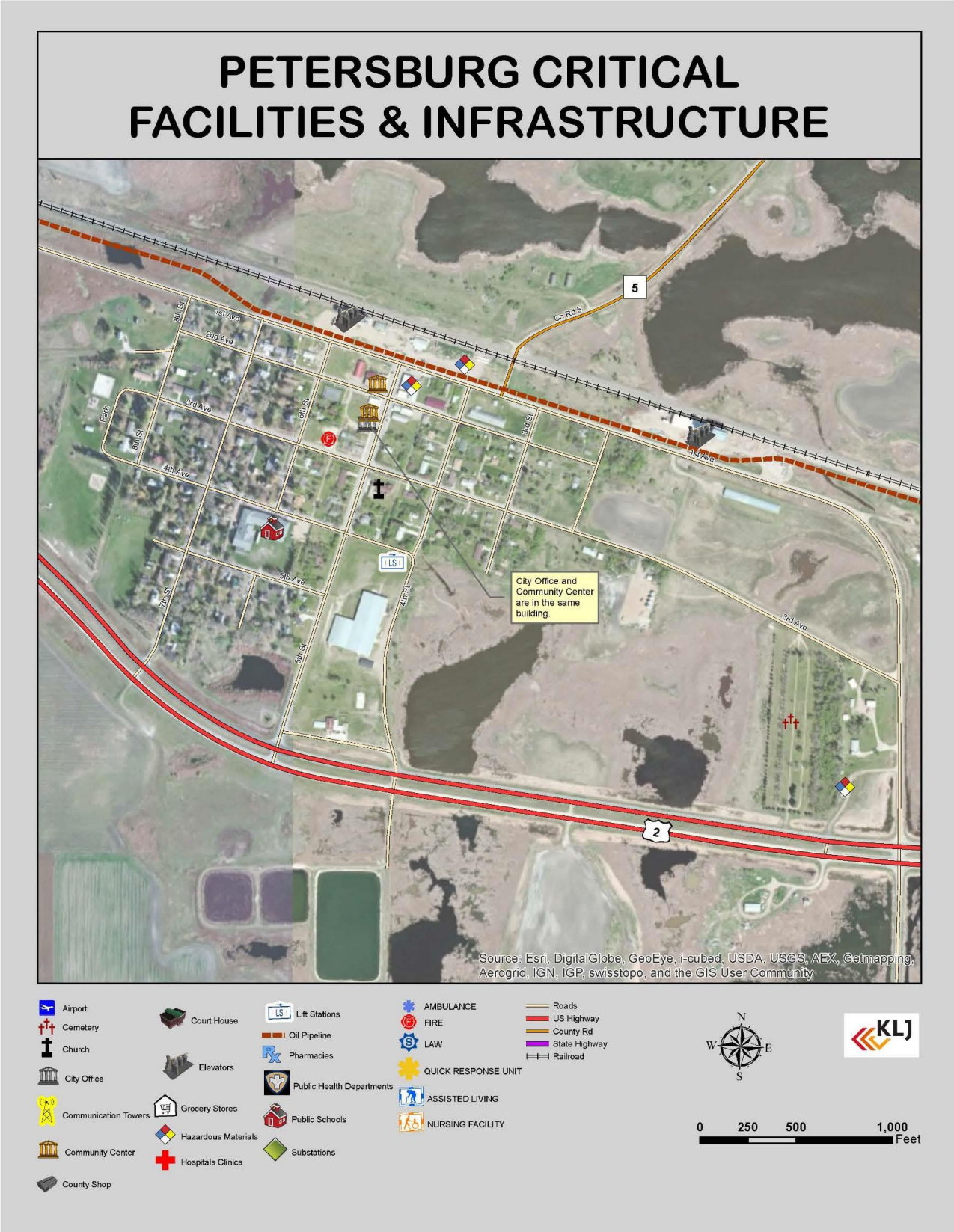
FACILITY	ADDRESS	COMMUNITY	CATEGORY
MCVILLE MUNICIPAL AIRPORT	NW MCVILLE	MCVILLE	AIRPORT
NELSON COUNTY HEALTH SYSTEM CARE CENTER	108 EAST NYHUS AVE	MCVILLE	ASSISTED LIVING OR NURSING FACILITY
NELSON COUNTY HEALTH SYSTEM ASSISTED LIVING	514 OLSGARD ST N	MCVILLE	ASSISTED LIVING OR NURSING FACILITY
NEW LUTHER VALLEY LUTHERAN CHURCH	309 MAIN ST N	MCVILLE	CHURCH
MCVILLE LUTHERAN CHURCH	112 VAIL AVE W	MCVILLE	CHURCH
MCVILLE CITY OFFICE	113 MAIN ST N	MCVILLE	CITY OFFICE
COUNTY SHOP-MCVILLE	213 MCDOUGALL AVE W	MCVILLE	COUNTY SHOP
CHS INC, MCVILLE	100 SOUTHWEST HWY 15	MCVILLE	ELEVATOR
OXTON'S FOOD INC	121 MAIN ST	MCVILLE	FOOD & LIVING ESSENTIALS
MCVILLE CITY AUDITORIUM	101 MAIN ST N	MCVILLE	PLACE FOR GATHERING
NELSON/GRIGGS DISTRICT HEALTH UNIT	116 MAIN ST	MCVILLE	PUBLIC HEALTH DEPARTMENT
MCVILLE FIRE	203 S BALDWIN ST	MCVILLE	RESPONDERS
MCVILLE AMBULANCE SERVICE	203 BALDWIN ST	MCVILLE	RESPONDERS
DAKOTA PRAIRIE ELEMENTARY SCHOOL	101 NYHUS AVE	MCVILLE	SCHOOL
D&M SERVICE	214 MAIN ST & HWY 15	MCVILLE	TIER II FACILITIES
TRI COUNTY PETROLEUM INC	2402 112 AVE NE	MCVILLE	TIER II FACILITIES
FARMERS UNION OIL COMPANY	11182 HIGHWAY 15 W	MCVILLE	TIER II FACILITIES
CENTRAL PLAINS AG SERVICES- MCVILLE	100 SW HWY 15	MCVILLE	TIER II FACILITIES
CHS, INC MCVILLE	100 SOUTHWEST HWY 15	MCVILLE	TIER II FACILITIES
NELSON CO HWY DEPT	213 W MCDOUGALL AVE	MCVILLE	TIER II FACILITIES


MICHIGAN CITY CRITICAL FACILITIES & INFRASTRUCTURE
City Office, Fire Dept and Community Center are in the same building.
6th St
Winnifred St
3rd St
2nd St
1st St
Front St
James St
South St
Broadway
State Ave
Jeannette Ave
Wisconsin Ave
Troy Ave
Inez Ave
Park Ave
State Hwy 35
Co Rd 35
US Highway 2
35
2
LS
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
S
E
W
KLJ
0 275 550 1,100 Feet

FACILITY	ADDRESS	COMMUNITY	CATEGORY
MICHIGAN LUTHERAN	421 BROADWAY N	MICHIGAN CITY	CHURCH
ST LAWRENCE O'TOOLE CATHOLIC	222 BROADWAY N	MICHIGAN CITY	CHURCH
BETHESDA MINISTRIES	JEANETTE AVE N	MICHIGAN CITY	CHURCH
MICHIGAN CITY OFFICE	113 BROADWAY N	MICHIGAN CITY	CITY OFFICE
COUNTY SHOP-MICHIGAN	321 WISCONSIN AVE S	MICHIGAN CITY	COUNTY SHOP
MICHIGAN ELEVATOR	215 FRONT ST E	MICHIGAN CITY	ELEVATOR
MICHIGAN ELEVATOR	115 JEANETTE AVE S	MICHIGAN CITY	ELEVATOR
MICHIGAN HOMETOWN FOODS INC	113 1ST ST E	MICHIGAN CITY	FOOD & LIVING ESSENTIALS
LIFT STATION	423 SOUTH ST E	MICHIGAN CITY	LIFT STATION
LIFT STATION	INEZ AVE	MICHIGAN CITY	LIFT STATION
MICHIGAN CIVIC CENTER	113 BROADWAY N	MICHIGAN CITY	PLACE FOR GATHERING
MICHIGAN AMBULANCE SERVICE	117 BROADWAY N	MICHIGAN CITY	RESPONDERS
MICHIGAN FIRE DEPT	117 BROADWAY N	MICHIGAN CITY	RESPONDERS
IN SERVICE SUBSTATION	INEZ AVE & SOUTH ST	MICHIGAN CITY	SUBSTATIONS
FARMERS UNION OIL COMPANY-MICHIGAN	113 S ST E	MICHIGAN CITY	TIER II FACILITIES
CHS, INC. - LAKE REGION GRAIN COOPERATIVE	111 BROADWAY SOUTH	MICHIGAN CITY	TIER II FACILITIES
MICHIGAN AMOCO, LLC - BULK PLANT	103 FRONT ST	MICHIGAN CITY	TIER II FACILITIES
TESORO/AMOCO FACILITY	202 SOUTH ST W	MICHIGAN CITY	TIER II FACILITIES
NDDOT MICHIGAN	519 SOUTH ST E	MICHIGAN CITY	TIER II FACILITIES


PEKIN CRITICAL
FACILITIES & INFRASTRUCTURE
Lonson Ave
2nd St
105th Ave NE
1st St
Main St
Anne Ave
Anne Ave
City Office and Community Center are in the same building.
15
Alstad Ave
1st St
Main St
2nd St
Railroad Ave
Burlington Northern Santa Fe
15
State Hwy 15
15
LS
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
W
E
S
KLJ
0 140 280 560
Feet

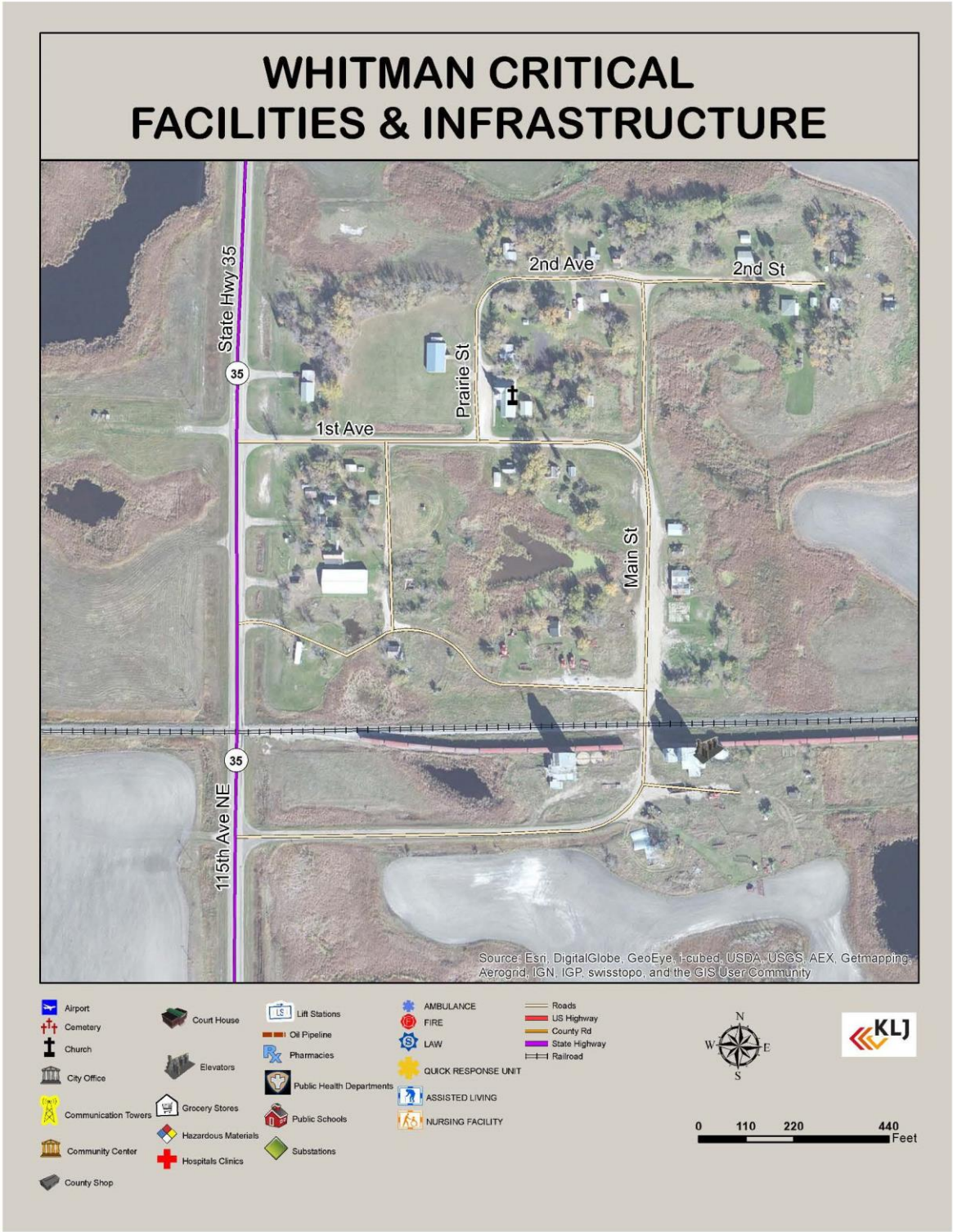
FACILITY	ADDRESS	COMMUNITY	CATEGORY
PEKIN LUTHERAN	124 ANNE AVE W	PEKIN	CHURCH
PEKIN CITY OFFICE	204 MAIN ST N	PEKIN	CITY OFFICE
PEKIN COOPERATIVE ELEVATOR	120 S MAIN ST	PEKIN	ELEVATOR
LIFT STATION	NEAR NDDOT SITE	PEKIN	LIFT STATION
PEKIN AUDITORIUM	121 MAIN ST NE	PEKIN	PLACE FOR GATHERING
PEKIN COMMUNITY CENTER	204 MAIN ST N	PEKIN	PLACE FOR GATHERING
PEKIN FIRE DEPT	122 MAIN ST N	PEKIN	RESPONDERS
IN SERVICE SUBSTATION	121 RAILROAD AVE W	PEKIN	SUBSTATIONS
PEKIN COOP ELEVATOR	120 S MAIN ST	PEKIN	TIER II FACILITIES
NDDOT PEKIN	205 MAIN ST S	PEKIN	TIER II FACILITIES


PETERSBURG CRITICAL FACILITIES & INFRASTRUCTURE
5
Co Rd 5
1st Ave
2nd Ave
3rd Ave
4th Ave
5th Ave
1st St
2nd St
3rd St
4th St
5th St
6th St
7th St
8th St
Park
City Office and Community Center are in the same building.
2
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
W
E
S
KLJ
0 250 500 1,000 Feet

FACILITY	ADDRESS	COMMUNITY	CATEGORY
PETERSBURG CEMETERY	PETERSBURG TOWNSHIP	PETERSBURG	CEMETERY
PETERSBURG LUTHERAN CHURCH	309 5TH ST	PETERSBURG	CHURCH
PETERSBURG CITY OFFICE	208 5TH ST	PETERSBURG	CITY OFFICE
PETERSBURG ELEVATOR-DAHLEN FARMERS ELEVATOR	519 1ST AVE	PETERSBURG	ELEVATOR
PETERSBURG ELEVATOR-AMERICAN BEAN LLC	101 1ST AVE	PETERSBURG	ELEVATOR
LIFT STATION	4TH ST & 4TH AVE	PETERSBURG	LIFT STATION
PETERSBURG AUDITORIUM	2ND AVE & FIFTH ST	PETERSBURG	PLACE FOR GATHERING
PETERSBURG COMMUNITY CENTER	208 5TH ST	PETERSBURG	PLACE FOR GATHERING
PETERSBURG FIRE DEPT	515 3RD AVE	PETERSBURG	RESPONDERS
DAKOTA PRAIRIE HIGH SCHOOL	518 4TH AVE	PETERSBURG	SCHOOL
S & S AGRI-SERVICE	419 1ST AVE N	PETERSBURG	TIER II FACILITIES
PETERSBURG OIL COMPANY - BULK PLANT	41 121ST AVE NE	PETERSBURG	TIER II FACILITIES
PETERSBURG OIL COMPANY	125 S 5TH ST	PETERSBURG	TIER II FACILITIES

TOLNA CRITICAL
FACILITIES & INFRASTRUCTURE
Co Rd 23
Gertrude St
Akin Ave
Helen St
Ester St
Margaret St
Winter Ave
Co Rd 24
24
23
Marjorie St
Welcome Ave
Lee Ave
Main St
Fire Dept and Quick Response Unit are in the same building.
LS
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Airport
Cemetery
Church
City Office
Communication Towers
Community Center
County Shop
Court House
Elevators
Grocery Stores
Hazardous Materials
Hospitals Clinics
Lift Stations
Oil Pipeline
Pharmacies
Public Health Departments
Public Schools
Substations
AMBULANCE
FIRE
LAW
QUICK RESPONSE UNIT
ASSISTED LIVING
NURSING FACILITY
Roads
US Highway
County Rd
State Highway
Railroad
N
W
E
S
KLJ
0 175 350 700 Feet

FACILITY	ADDRESS	COMMUNITY	CATEGORY
TOLNA LUTHERAN CHURCH	219 MAIN ST N	TOLNA	CHURCH
ST JOSEPH'S CATHOLIC CHURCH	220 MAIN ST N	TOLNA	CHURCH
TOLNA CITY OFFICE	200 MAIN ST N	TOLNA	CITY OFFICE
COUNTY SHOP-TOLNA	LEE AVE W	TOLNA	COUNTY SHOP
TOLNA ELEVATOR-TRONSON GRAIN LLC	RAILROAD AVE	TOLNA	ELEVATOR
MELISSA'S TOLNA MARKET	119 MAIN ST N	TOLNA	FOOD & LIVING ESSENTIALS
LIFT STATION	MARJORIE ST S	TOLNA	LIFT STATION
TOLNA SCHOOL BUILDING	400 MAIN ST N	TOLNA	PLACE FOR GATHERING
TOLNA TOWN HALL	MAIN ST & LEE AVE	TOLNA	PLACE FOR GATHERING
TOLNA QUICK RESPONSE	108 MAIN ST N	TOLNA	RESPONDERS
TOLNA FIRE DEPT	108 MAIN ST N	TOLNA	RESPONDERS
FARMERS UNION OIL COMPANY	110 MAIN ST S	TOLNA	TIER II FACILITIES
TRONSON GRAIN, LLC	RAILROAD AVE	TOLNA	TIER II FACILITIES
FARMERS UNION OIL COMPANY	215 MAIN ST S	TOLNA	TIER II FACILITIES



FACILITY	ADDRESS	COMMUNITY	CATEGORY
SARNIA UNITED LUTHERAN	1ST AVE & PRAIRIE ST	WHITMAN	CHURCH
WHITMAN ELEVATOR	217 MAIN ST	WHITMAN	ELEVATOR

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, 2012 population provided by the US Census Bureau.

Table 3.2A Population Statistics

Location	July 1, 2013 Estimated Population	Change Since 2010 Census
Nelson County (TOTAL)	3,095	-1.0%
City of Aneta	222 (2010)	NA
City of Lakota	672 (2010)	NA
City of McVille	349 (2010)	NA
City of Michigan	294 (2010)	NA
City of Pekin	70 (2010)	NA
City of Petersburg	192 (2010)	NA
City of Tolna	166 (2010)	NA

Source: US Census Bureau, 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 Nelson County:

- Housing units: 1,933
- Occupied housing units: 1,493
- Median value of owner-occupied housing units (2012): $52,000
- Housing Unit Density # Per Square Mile: .51
- Persons per household: 2.01
- Private non-farm establishments: 130
- Building Permits: 4

US Census Bureau, Total Housing Units and Housing Density from 2010 Decennial Census

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

- 2013 taxable valuation of residential property in Nelson County: $1,689,263
- 2013 taxable valuation of commercial property in Nelson County: $817,786
- 2013 taxable valuation of agricultural land in Nelson County: $14,741,022

Source: North Dakota Office of State Tax Commissioner, 2013

3.3 Economic, Ecologic, Historic, and Social Values

The economy of Nelson 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: $43,622
- Persons below poverty: 8.4%

- Total number of firms (2007): 558

Source: US Census Bureau, 2008-2012 American Community Survey

The sales, shipments, receipts, or revenue for Nelson County by industry are as follows:

- Retail trade: $24,384,000
- Wholesale trade: $138,226,000
- Manufacturing: $600,000
- Health care and social assistance: $5,775,000
- Accommodation and food services: $2,030,000

Source: US Census Bureau, 2007.

Based on data from the US Census of Agriculture in 2007, Nelson County had:

- Number of farms:651 farms
- Acres in farmland: 550,121 acres
- Total market value of agricultural products sold: $85,369,000
- Market value of crops sold: $77,333,000
- Market value of livestock, poultry, and their products sold: $8,036,000

Source: US Department of Agriculture, 2007

The ecologic, historic, and social values of Nelson 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 Nelson County include Stump Lake the Sheyenne River Valley, and 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 Sheyenne River Valley is wooded with mixed hardwood stands, timbered hills, and lush river bottoms, thus containing an abundance of plant and animal life. Stump Lake provides recreation for Nelson County residents. Nelson County established Stump Lake Park and has expanded its use. A frontier village with settlement era buildings and farm machinery is located in the park. Camp Grounds, boat ramps, and fish cleaning stations are set up throughout the park in conjunction with the North Dakota Parks and Recreation Department and North Dakota Game and Fish. The most outstanding feature of Stump Lake Park is the Stump Lake Pavilion which serves as a recreational center for Nelson County residents. Listed endangered species in Nelson 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). Nelson County has numerous lands that are designated for wildlife production but yet are open to public hunting. They are listed in table 3.3A below.

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. Nelson County has three resources listed in the National Register of Historic Places. They are the Nesheim Bridge which crosses the Sheyenne River approximately two miles southwest of Mcville, the Old Settler's Pavilion or Stump Pavilion at Stump Lake, and the Tofthagen Library and Museum in Lakota.

Social values are difficult to quantify but are an important aspect of quality of life and interpersonal relationships. Examples of social values in Nelson 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. Nelson County has a high Social Vulnerability to Environmental Hazards ranking along with nineteen other counties. Two counties (Cass and Burleigh) have a low rating. (Hazards and Vulnerability Research Institute, University of South Carolina)

Ecological 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 ecological values.

Nelson County has Wildlife Management Areas located throughout the county. The management areas, size, location, and wildlife species are listed below in the table.

Table 3.3A Nelson County Wildlife Management Areas

State Wildlife Management Areas	Size (acres)	Location	Wildlife
Black Swan	854	11 miles north, 4 miles west of Junction ND 15 & 1	Waterfowl, Upland Game, Deer

Hoghaug Wildlife Sanctuary	610	2 miles north, 2 miles west, 4 miles north, and 1 mile east of Tolna	Waterfowl, Upland Game, Deer
McVille	244	5 miles north, 1 mile west of McVille	Waterfowl, Upland Game, Deer

Source: North Dakota Game and Fish, 2014

Table 3.3B Nelson County Wildlife Management Areas

Federal Wildlife Management Areas	Location	Wildlife
US Fish and Wildlife Service Waterfowl Production Area	8 miles north of Lakota	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	6 miles north, 2 miles east of Lakota	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	7 miles north, 4 miles east of Lakota	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	4 miles north, 4 miles east of Lakota	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	3 miles north, 3 miles east of Michigan	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	7 miles south, 5 miles east of Lakota	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	7 miles south, 6 miles east of Lakota	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	1 mile south, 1 mile east of Michigan	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	5 miles south, 5 miles west of Petersburg	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	4 miles north of McVille	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	6 miles north, 1 mile west of McVille	Waterfowl, Upland Game, Deer

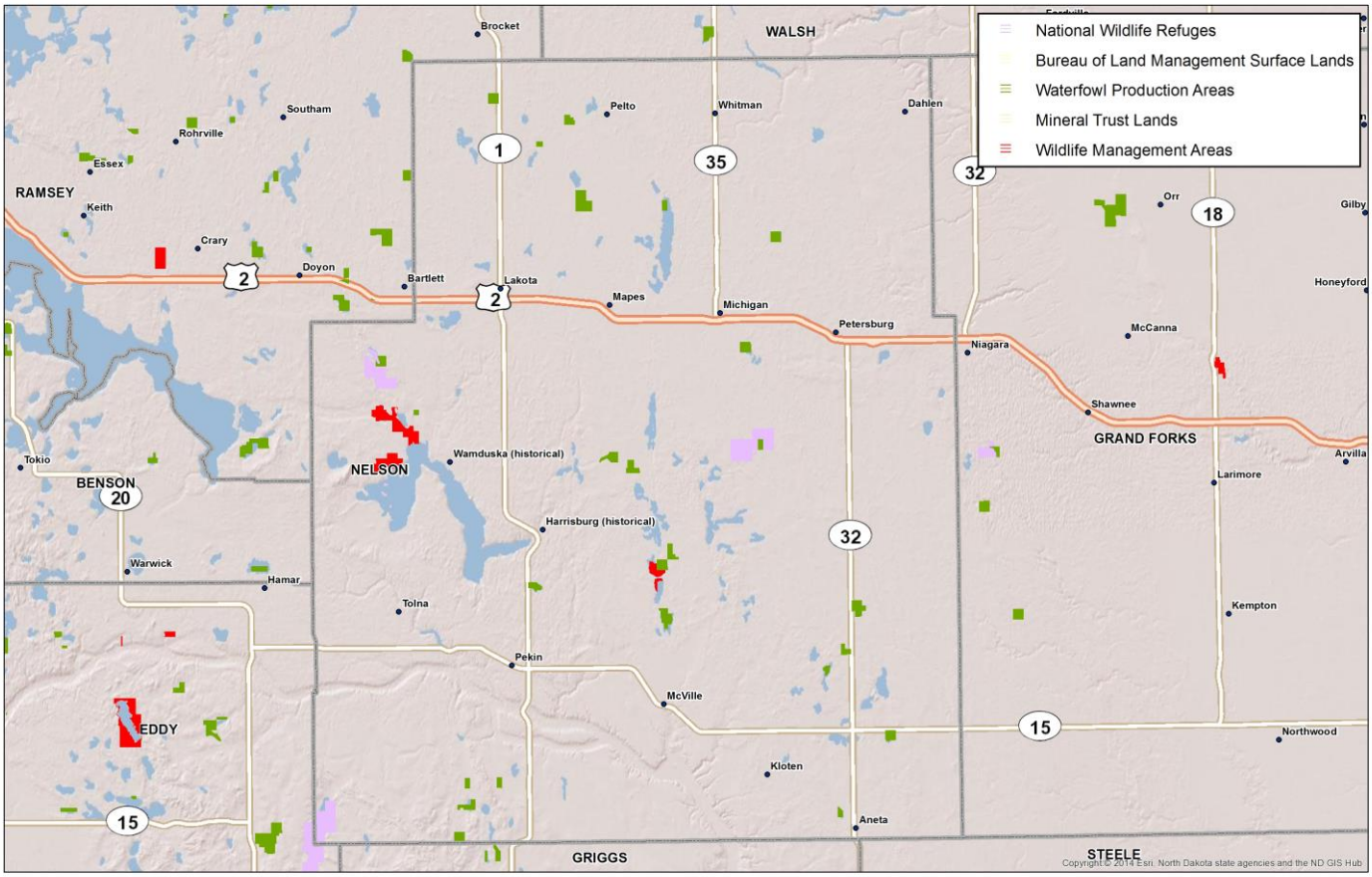
US Fish and Wildlife Service Waterfowl Production Area	7 miles north of McVille	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	2 miles north, 7 east of McVille	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	6 miles south of Pekin	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	6 miles south, 1 mile west of Pekin	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Waterfowl Production Area	6 miles south, 2 miles west of Pekin	Waterfowl, Upland Game, Deer
US Fish and Wildlife Service Wildlife Refuge	8 miles south, 5 miles west of Pekin	Waterfowl, Upland Game, Deer

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. According to the National Park Service's National Register of Historic Places, Nelson County has three structures in the Federal Register of Historical Places.

3.4 Current Land Use

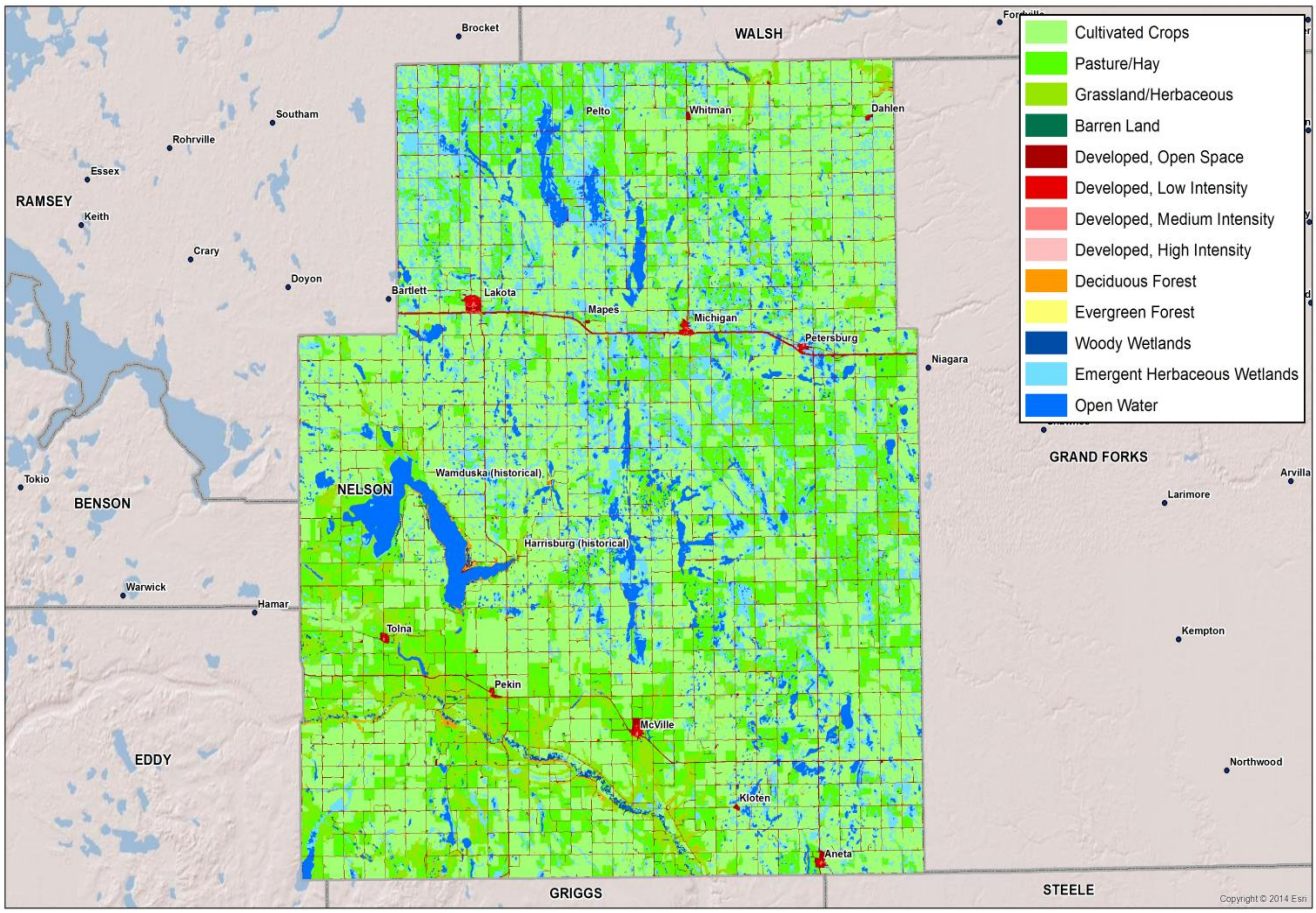
Nelson County is largely devoted to agriculture. Small communities and individual homes and farms are interspersed throughout the remainder of the county. Most of the agricultural lands are croplands, with scattered areas of livestock and forage. Infrastructure such as railways, roads, and highways traverse the county. A few areas are government managed as shown in Figure 3.4A. Figure 3.4B shows the land cover in the county, Figure 3.4C demonstrates the county land use.

Figure 3.4A State and Federal Managed Lands



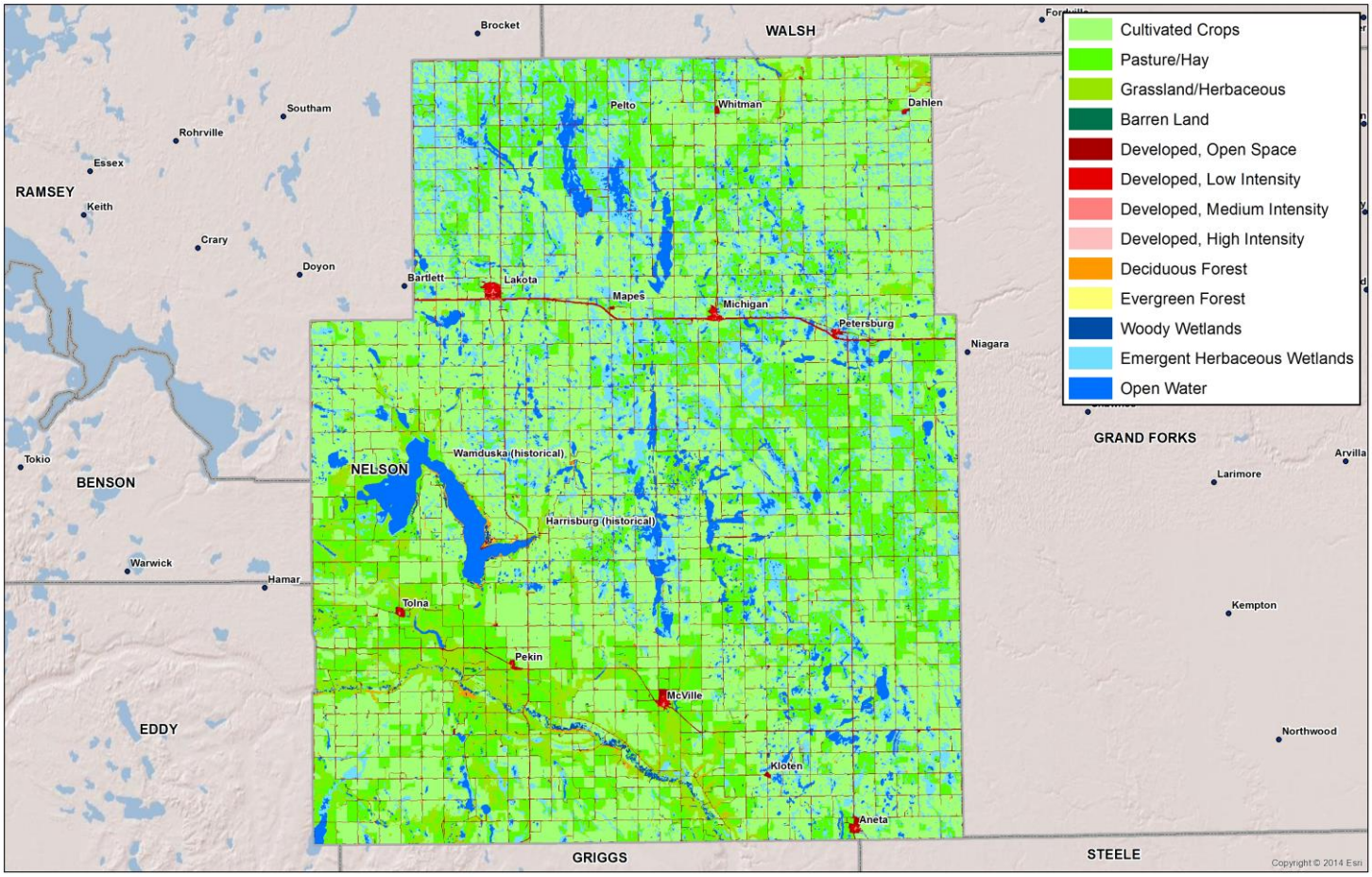
Source: ND GIS Hub, 2014

Figure 3.4B Land Cover



Source: ND GIS Hub, 2014

Figure 3.4C Land Use Map



Source: ND GIS Hub, 2014

3.5 New Development

Nelson County trends indicate slowly to declining growth in the county resulting in a net loss of population. However, as larger, neighboring communities grow, such as Grand Forks, the influx of people may assist growth in the rural counties. As well, the oil boom in the western part of North Dakota and high agricultural prices in 2012 and 2013 have brought additional people into the state.

The US Census Bureau estimates the number of residential building permits, units, and construction costs by county.

Table 3.5A New Privately-Owned Residential Building Permit Data

Year	Residential Building Permits	Units	Construction Costs
2008	0	0	0
2009	1	1	$100,000

2010	7	7	$1,018,122
2011	6	6	$700,000
2012	4	4	$1,390,000
TOTAL	18	18	$1,655,000

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

Table 3.5B New Development Since 2008

Jurisdiction	Description
Nelson County	26 building permits were issued since January 2008. Construction included 1 communications tower, 1 crude oil pipeline and pump station, 7 equipment shelters, 1 campground convenience store, 1 sewer system, 3 pole sheds/barns, 6 homes w/ and w/o garages, 1 fishing shack, 2 manufactured home placements, and 3 garages
Aneta	4 building permits. 2 houses, 2 garages
Lakota	89 building permits were issued since January 2008. Construction included 9 new residential homes, 8 sheds, 7 decks, 2 residential demolitions, 28 garages, 3 roofing/residing of residential homes, 7 residential additions, 3 residential fence construction projects, 1 sidewalk install, 2 remodel projects, 2 residential concrete driveways, and 12 business permits including: Seed & chemical building, Seed storage building, Grain Dryer, Storage Building, Electrical Building, Addition, Locomotive Garage, Seed Bin Storage, Mega Fertilizer plant, 3 remodels
McVille	30 building permits issued since Jan 2008; 3 new homes, 5 garages, 5 room additions, 1 shop/garage, Elevator added large grain handling units and Stein Seed, Charlie Stein added grain bins. 7 storage units were added to residents yards
Michigan	18 building permits issued since January 2008. 1 pole barn, 7 storage sheds, 2 decks, 4 garages, 1 steel building, 2 home additions, 1 porch
Pekin	6 building permits issued since January 2008. 4-Deck Permits, 2-small sheds
Petersburg	6 building permits since 2008, 4 residential garages, 2 residential storage sheds
Tolna	No building permits have been issued

3.6 Future Development

The population growth and development trends in Nelson County are related to a strong birth rate, some out-migration, centralization to urban centers, and commuters moving to rural areas. 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 Building Codes, Zoning and Planning are used by the jurisdictions to guide future development.

Building 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. The jurisdictions in Nelson County that have adopted the state building code include:

- City of Aneta
- City of McVille
- City of Michigan
- City of Pekin
- City of Petersburg
- City of Lakota

Source: North Dakota Division of Community Services, 2013

Zoning:
In Nelson County, all of the cities have zoning including Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna.

Nelson County and the cities of Aneta, Lakota, Michigan, and Petersburg participate in the National Flood Insurance Program. Current flood plain maps are current as of 2009 when they were revised.

4. RISK ASSESSMENT / HAZARD PROFILES

4.1 Communicable Disease

Including Human, Animal, and Plant Diseases

Frequency	Possible	
Impact	Critical	
Risk Class	B	
Seasonal Pattern	None	
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, 2013)

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
- Norwalk Virus

- Severe Acute Respiratory Syndrome (SARS)
- Enterovirus D68 (EV-D68)
- Ebola

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 is 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's 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. To date there have been no reported cases in Nelson County. Source: http://www.cdc.gov/non-polio-enterovirus/about/ev-d68.html

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.

<u>Animal and Plant Disease</u>
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 Nelson County would be those diseases that affect small grains and forage such as wheat and barley, and cash crops like soybeans, dry beans, corn, and sunflowers. 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 Nelson 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 Nelson County, this may include the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna; however, they 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, Nelson 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) Recently, Ebola has impacted the world and the United States with an outcome unknown in 2014.

Nelson County has been affected by a foodborne gastroenteritis outbreak recently. In October, 2006 twenty six people were infected and 100 exposed to Norovirus at a Nelson County restaurant. Norovirus is a very contagious virus that can infect anyone. You can get it from an infected person, contaminated food or water, or by touching contaminated surfaces. The virus causes your stomach or intestines or both to get inflamed. This leads you to have stomach pain, nausea, and diarrhea and to throw up. These symptoms can be serious for some people, especially young children and older adults.

In neighboring Grand Forks County, they experienced a Tuberculosis (TB) outbreak in recent years. A total of 26 confirmed cases were reported in the county between 2010 and 2014. 24 of the 26 cases occurred in 2012 and 2013 and were connected through a social network as through genotyping of TB specimens. (Nelson County Public Health, 2014) The North Dakota Department of Health (NDDoH), Division of Disease Control has provided resources to conduct epidemiology activities, funding for directly observed therapy by public health nurses, and extensive training in TB detection and prevention.

Another disease that may annually effect both humans and animals in Nelson County is Nile Virus. West Nile Virus is not especially deadly for humans, but can be debilitating, especially for the elderly population.

Nelson County has an active mosquito monitoring program to identify mosquitos carrying the west nile virus. A vaccine has been developed for horses, to aid in the prevention of the disease.

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.
(North Dakota Department of Health, 2013)

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 Nelson 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.

Table 4.1.3A Nelson County Communicable Disease Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

<u>Animal Disease</u>
Rabies is an animal disease that is tracked very closely by NDDoH. Less than 10 total animals were tested for rabies and only one positive for rabies in 2012 within Nelson County (NDDoH).

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 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. Nine cases of anthrax were reported between the twenty year period of 1989 to 2009 in Nelson County (Source: North Dakota Department of Agriculture).

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 Nelson County. It is difficult to measure crop loss to disease, however if 20% of the crop value of $77,333,000 was lost in 2012 due to plant disease the loss is $15,466,600. In 2012, a USDA Disaster Declaration, S3467, was granted on January 9, 2012 for 37 counties in North Dakota related to combined effects of frosts and freezes, flooding, severe thunderstorms, hail, high winds, drought, and weather related insect and disease damage.

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 Nelson 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 Nelson 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 Nelson 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. **Pale and/or Golden potato cyst nematodes (PCN):** Globodera pallidia (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 which includes Nelson County. 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.

5. **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. In August 2003, it was found in eastern North Dakota. 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.

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	*No regional history*				Smallpox Outbreak	
	No local history			Severe Strain Influenza		
	100 years		Mild Strain Influenza			
	50 years	Food Borne Illnesses				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		Impact				

Quantifying the probability of a human epidemic affecting Nelson 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, however, Highway 2 has seen more traffic and the State has seen a flux of people. Therefore, disease could be brought into the local population by travelers. The populated areas such as Nelson have the greatest potential for the rapid spread of disease should a disease enter the community.

The cities in Nelson County Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna are more prone to disease outbreaks than the rural areas. Students in schools, children in childcare, adults in long term care facilities and hospitals are areas for concern for disease outbreaks as 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.

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 Nelson 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 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 Nelson County Kindergarten children is between 93-94 % for the major diseases. In 2011, the rate of vaccination for North Dakota children was 82.8 percent and 72.7 percent nationally. (North Dakota Department of Health, 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 ill, (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.

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 Nelson County. Although infectious diseases are not subject to geographic boundaries, again several populations in Nelson County are specifically at higher risk to infectious diseases including day care facilities, schools and the elderly care facilities. The county economy relies heavily on the agriculture, 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 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 Nelson County include education and utility services.

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 those surfaces in Nelson County. Although infectious diseases are not subject to geographic boundaries, several populations in Nelson 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, 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, 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 Nelson County include health care, education, utility services, 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. Nelson County has one of the highest population ratios in the state regarding these vulnerable groups, including populations under age 5, over age 65 and living in group quarters. From the 2010 census, Nelson County has a relatively low population under 5; however a large population, over 27% of the total population of 3,126, are over the age of 65 (US Census Bureau).

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. Nelson County is designated as a Health Professional Shortage Area (HPSA) due to the shortage of a critical care facility, services and distances to higher level of care.

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 1,094 residents of Nelson County would be infected with about 625 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 living in a city or more populated area alone for disease susceptibility criteria, Pekin has the lowest susceptibly to the spread of communicable disease whereas Lakota and McVille have the highest susceptibly, Lakota because of its population and McVille because it has the county hospital. The other cities do not vary much from the county average. The table below shows the distribution; however, the communities with smaller populations also have less access to healthcare.

Table 4.1.5A Population living within Nelson County cities

Jurisdiction	Population
Nelson County	3,126
Aneta	222
Lakota	672
McVille	349
Michigan	294
Pekin	70
Petersburg	192
Tolna	166

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

Animal Disease

Animal diseases extending nationally would have an overarching effect on the national economy. More directly, though, Nelson 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, Nelson County had market value crop sales over $77 million 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, 2007). Additionally, Nelson County had 10,314 head of cattle and calves and 647 head of sheep and lambs based on 2007 USDA data.

Plant Disease

According to the 2007 Census of Agriculture, Nelson County had 651 farms covering 550,121 acres with annual cash receipts totaling over $85 million in 2007. 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, etc…) 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, health facilities, and communities. The entire county population of less than 4,000 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 Nelson 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% attack rate, a 0.8% hospitalization rate among the ill, and a 0.2% mortality rate among the ill, in Nelson County:

1. 938 persons would become ill and may require outpatient care
2. 25 persons may require hospitalization
3. 3 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.

<u>Animal Disease and Plant Disease</u>
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, Nelson County loss would be $15,466,600 in crops and $1,607,00 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 cleanup of anthrax in several congressional offices on Capitol Hill in September and October of 2001 cost the Environmental Protection Agency about $27 million. (US General Accounting Office, 2003) 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 Nelson County, but the location of such population increases would probably not matter.

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

4.2 Dam Failure

Frequency	Likely	
Impact	Critical	
Risk Class	B	
Seasonal Pattern	Spring during ice melt and summer caused by severe thunderstorms	
Duration	Hours to days	
Speed of Onset	Minutes to days	

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. Most of the dams in Nelson County are earthen watershed dams constructed for flood control.

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, Nelson County has 17 low hazard dams and 4 dams that are medium hazard.

Table 4.2.1A Nelson County Dams, Purpose, and Hazard Category

Structure Name	Purpose	Hazard Category	Areas of Inundation Should a Breach Occur
GALDE DAM; LLOYD	Recreation	Low	Agricultural Land
FREDRICKSON DAM; OLE 1	Fish & Wildlife	Low	Agricultural Land
FREDRICKSON DAM; OLE 2	Fish & Wildlife	Low	Agricultural Land
GRONAAS DAM; CLEMET	Livestock	Low	Agricultural Land
GOOSE RIVER WDA	Fish & Wildlife	Low	Agricultural Land
HILLESLAND DAM; DON 2	Other	Low	Agricultural Land
HILLESLAND DAM; DON 1	Other	Low	Agricultural Land
Silver Creek Dam	Other	Low	Agricultural Land
MCVILLE RAILROAD DAM	Water Supply	Medium	Agricultural Land
TOLNA DAM NO. 1	Recreation	Medium	See Section 4.2.6, Risk Assessment for a complete discussion of Tolna Dam area of potential inundation.
Myron ENSRUD DAM	Recreation	Medium	Agricultural Land
WIXO DAM; ANTON	Fish & Wildlife	Low	Agricultural Land
WILLIAMS DAM; LEE	Fish & Wildlife	Low	Agricultural Land
ENGEN DAM; RANDY	Fish & Wildlife	Low	Agricultural Land
LAMBS LAKE DAM	Fish & Wildlife	Low	Agricultural Land
ROSE LAKE DAM	Fish & Wildlife	Low	Agricultural Land
HADLICH DAM; MARK & ROBIN 3	Fish & Wildlife	Low	Agricultural Land
HADLICH DAM; MARK & ROBIN 1	Fish & Wildlife	Low	Agricultural Land
HADLICH DAM; MARK & ROBIN 2	Fish & Wildlife	Low	Agricultural Land
WHITMAN DAM	Flood Control	Medium	Agricultural Land
SARNIA DAM	Flood Control	Low	Agricultural Land

Source: http://www.swc.nd.gov/4dlink8/4dcgi/StructureSearchWeb

However, Devils Lake flows naturally through the Jerusalem Coulee to Stump Lake which is in Nelson County. The Tolna Coulee is the natural outlet from Stump Lake. As recently as 2011, Stump Lake was less than four feet from overflowing naturally. The Tolna Coulee area, which was created by successive natural overflows of the lakes since the last ice age, is comprised of erodible soils. Thus, if Stump Lake were to reach a high enough elevation, the divide between Stump Lake and Tolna Coulee, could rapidly and catastrophically erode, causing significant flooding damages downstream. Thus, this structure, the Tolna Coulee Control Structure, was designed to permit erosion of the divide, allowing the lake to lower, as it would have without the project, while limiting releases to no more than 3,000 cubic feet per second (cfs). The embankment protecting the City of Devils Lake (located in Ramsey County west of Nelson County) is considered to be a dam by the United States Corps of Engineers and Tolna Coulee its spillway. Therefore, the 3,000 cfs release limit through the control structure at Tolna Coulee is in place because of federal dam safety regulations. It should be noted, however, that under an extreme flood event (larger than has ever been recorded in Devils Lake), flows through the control structure could exceed 3,000 cfs. (Source: North Dakota Water Commission, Handout July 2012).

There is no breach risk to the Tolna Coulee Control Structure as explained in Figure 4.2.1B below. The outlet does not hold back water but serves as an erosion control structure as water spills out of Stump Lake into the Tolna Coulee.

Figure 4.2.1B Key Points of the Tolna Coulee Control Structure (Source: North Dakota Water Commission, Handout July 2012).

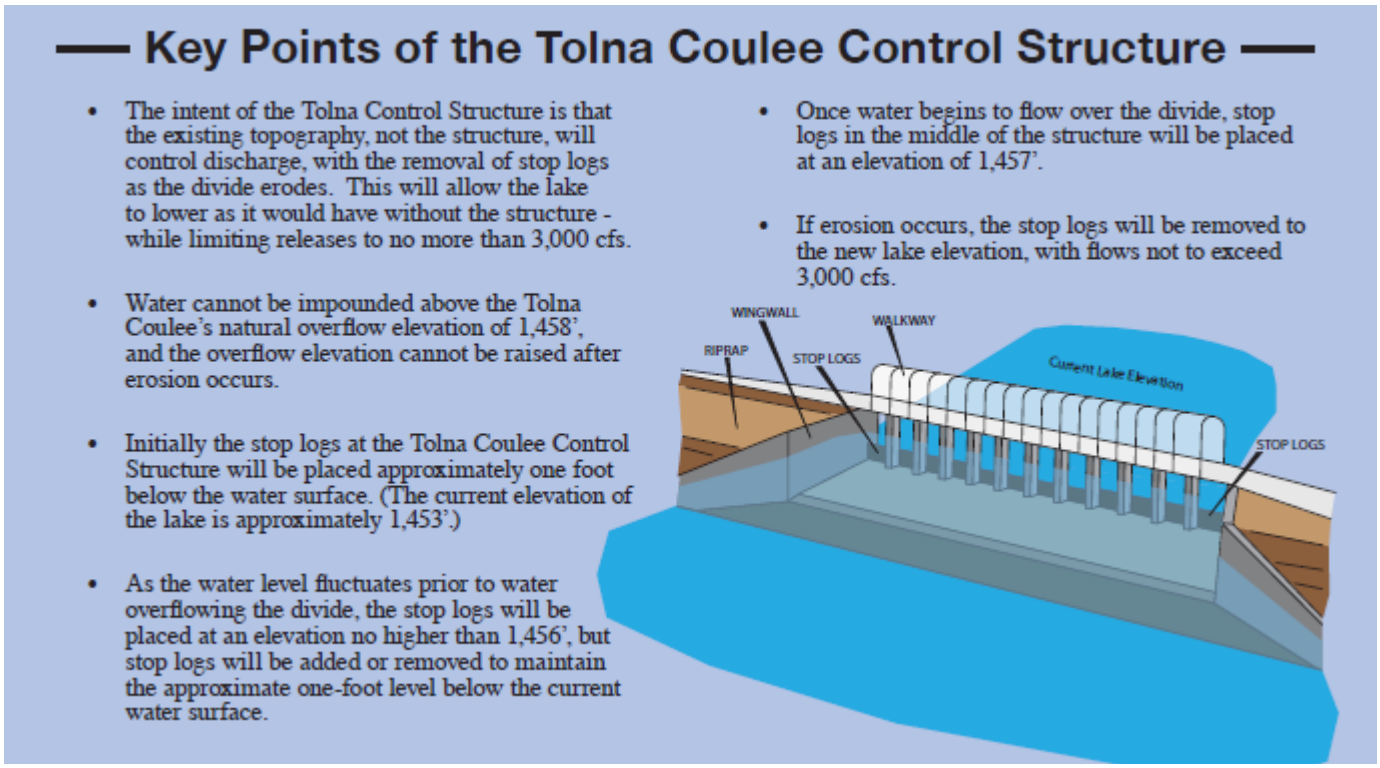


Figure 4.2.1C Tolna Coulee Control Structure (North Dakota Water Commission, July 2012)

4.2.2 Causes of Dam Failure

The most common causes of dam failure are hydrologic inadequacy and seepage related issues.

<u>Hydrologic Failures</u>
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)

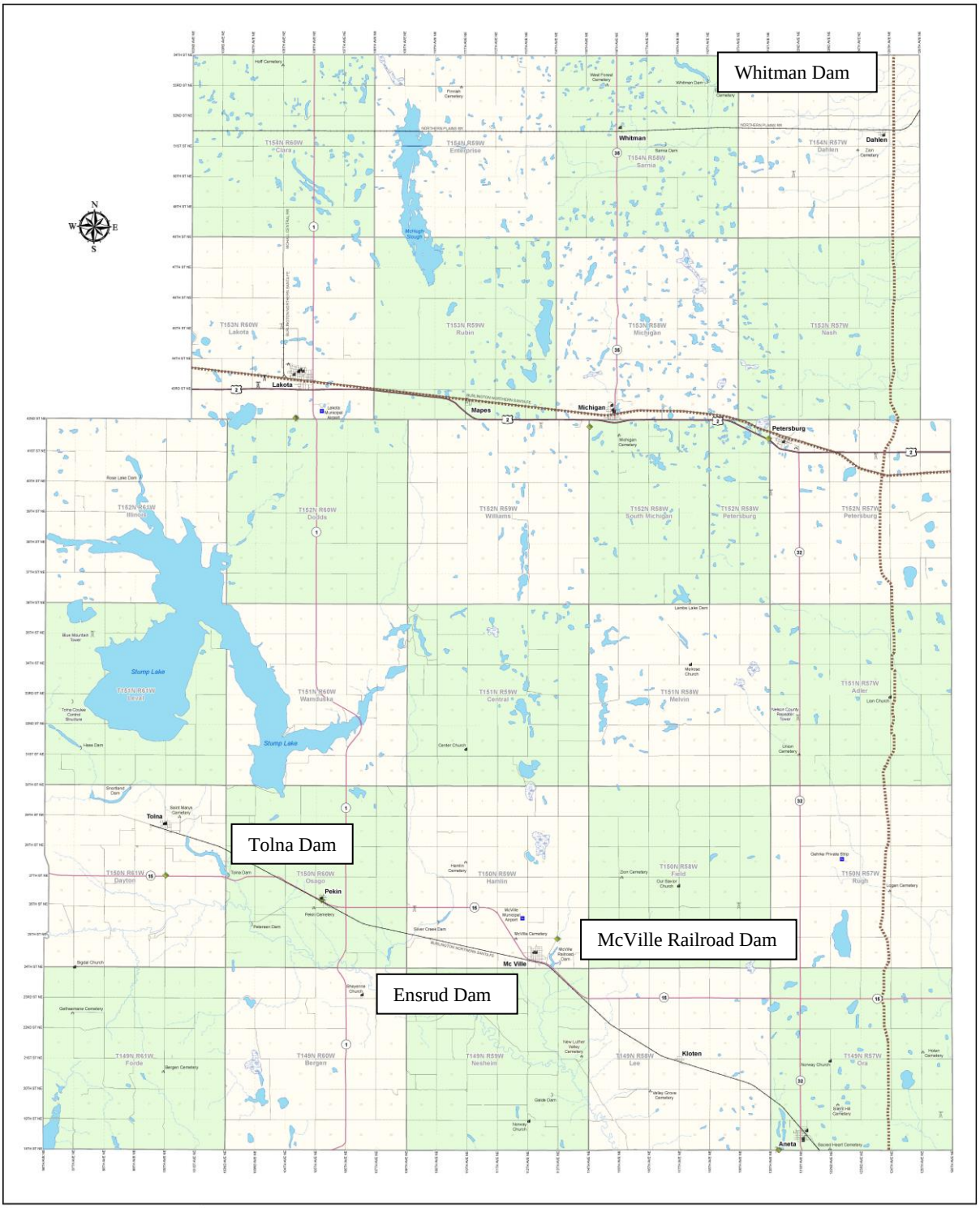
Seepage Failures

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)

4.2.3 Geographic Location

The locations of the medium hazard dams in Nelson County can be found in Figure 4.2.2A**.** In Nelson County, this would include all the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna.

Figure 4.2.3A Medium Hazard Dams



Legend

- Airport
- Cemetery
- Church
- Communication Towers
- Dams
- Pipelines
- Railroad
- Substations

Roads
- US Highway
- State Highway
- Rural & City

Ponds and Lakes
- Lake or Pond
- Marsh or Wetland

Rivers and Streams
- Intermittent Streams
- Perennial Streams

Township
- Township
- Section Line

Nelson County, ND

0 1.25 2.5 5 Miles

1:62,500

Lambert Conformal Conic Projection

KLJ

This map was produced by the KLJ (Kadrmas, Lee & Jackson) GIS Division utilizing ESRI's ArcMap 10.2 on Windows 32 workstations.

For more information on the full capabilities of the KLJ GIS Division or the benefits of GIS, contact Curtis Freeman (GIS Division Mgr.) at (701) 483-1284 or by e-mail at curtis.freeman@klj-eng.com

KLJ has compiled this map according to conventional cartographic standards, using what is thought to be the most reliable information available. KLJ does not guarantee the accuracy of the information and disclaims any legal responsibility or liability for interpretations made from the map, or decisions based therein.

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December 2015

Source: ND GIS Hub, 2014

4.2.4 Previous Occurrences

Fortunately, Nelson County has not experienced any catastrophic dam failures. Devils Lake – Stump Lake have risen and consumed several homes and acres of crop land; however, a major and sudden release of water has not happened. All the rising water has come at a slow rate with sufficient warning for residents to take action.

Table 4.2.4A Nelson County Dam Failure Declared Disasters and Emergencies

Declaration	Location	Date	Magnitude	Casualties	Damages
None					

4.2.5 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 4.2.5A Hazard Frequency and Impact Ranges

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

The dam failure probability is somewhat low based on a minimal history of significant events and the regular inspection and upkeep of the high hazard dams. 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 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.

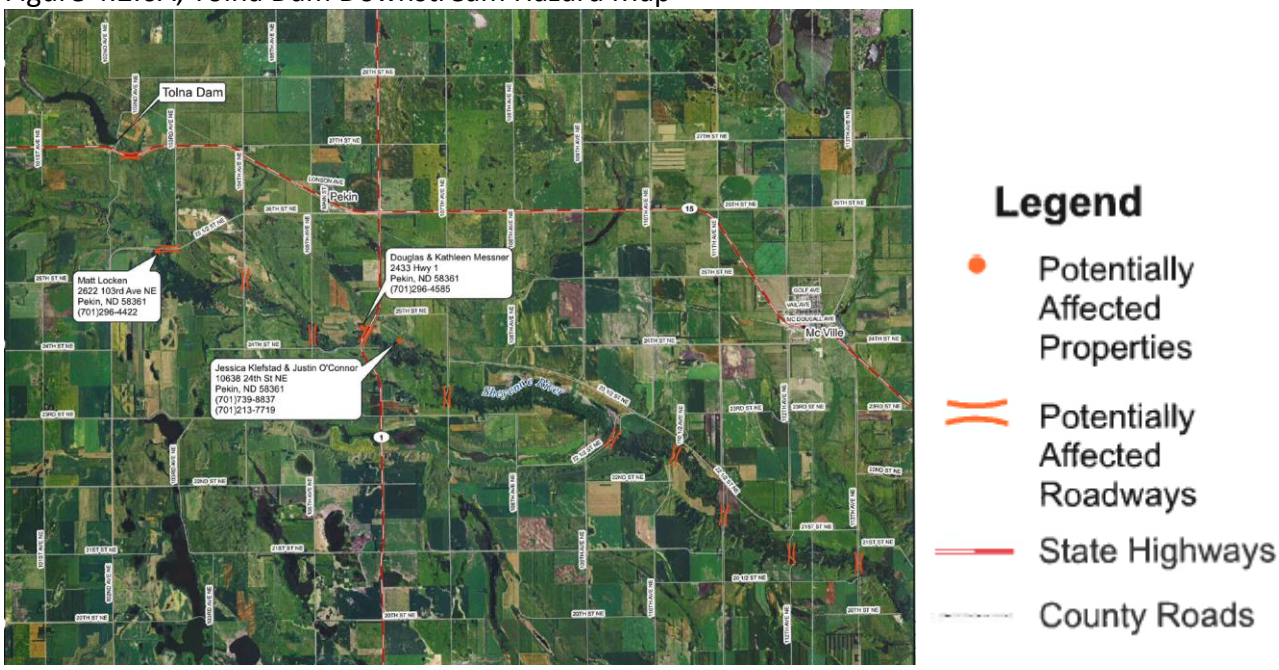
4.2.6 Risk Assessment

Vulnerability Overview

The Devils Lake Basin should be discussed in the Dam Risk Assessment area due to the amount of water held in this area and where it flows. The Devils Lake Basin is a 3,810-square-mile closed basin in the Red River of the North (Red River) Basin, in North Dakota. About 3,320 square miles of the total 3,810 square mile is tributary to Devils Lake; the remainder is tributary to Stump Lake which is located in Nelson County. The Devils Lake Basin contributes to the Red River Basin only when the level of Devils Lake is greater than 1,458 feet (ft.) above sea level (msl). At an elevation of about 1,447 ft. msl, Devils Lake begins to spill into Stump Lake; and at an elevation of about 1,458 ft. msl, the combined lakes begin to spill through Tolna Coulee into the Sheyenne River (a tributary of the Red River). From 1867 to 2006, the lake level fluctuated between a maximum of 1,449.2 ft. msl in 2006 and a minimum of 1,400.9 ft. msl in 1940. In June 2009, the lake level was 1,450.7 ft. msl and continues to be in flood stage. (source: http://nd.water.usgs.gov/devilslake/index.html)

The Tolna Dam has an Emergency Action Plan that has been recently developed. The plan has yet to be validated through a Tabletop Exercise with the local fire departments and Nelson County officials. This exercise is in the planning stages at the time of the Multi-Hazard Plan being developed. In March, 2015 Tolna Dam developed a five foot hole and a large amount of water came through the hole. The Grand Forks National Weather Service Office issued a Flash Flood Watch cautioning downstream residents water may impact ND Highway 15 and cause flooding in the picnic area beside the dam. There are twelve farmsteads located below the dam and several township/farm access roads that may be impacted with dam failure. (Source: Tolna Dam Emergency Action Plan) There was no impact to these farmsteads or township/farm access roads with this incident because of the limited runoff in the spring of 2015 due to below average snow cover.

Figure 4.2.6A, Tolna Dam Downstream Hazard Map



PROPERTY OWNERS POTENTIALLY AT RISK						
First Name	Last Name	Business	Address	City	State	Phone #
Matt & Michelle	Locken		2622 103rd Ave NE	Pekin	ND	(701) 296-4422
Douglas & Kathleen	Messner		2433 Hwy 1	Pekin	ND	(701) 296-4585
Jessica	Klefstad		10638 24th St NE	Pekin	ND	(701) 739-8837
Justin	O'Connor		10638 24th St NE	Pekin	ND	(701) 213-7719

ROADWAYS POTENTIALLY AT RISK OF OVERTOPPING	
1	State Highway 15
2	25 1/2 St NE
3	104th Ave NE
4	105th Ave NE
5	State Highway 1
6	107th Ave NE
7	22 1/2 St NE
8	110 1/2 Ave NE
9	111th Ave NE
10	112th Ave NE
11	113th Ave NE

Whitman Dam has an Emergency Action Plan developed in the fall of 2011. The dam is currently owned by the Walsh County Water Resource District, although the dam is located in section 2 of Sarnia Township in Nelson County.

For the remaining dams, the inundation areas are not digitally mapped so the following vulnerabilities are estimated. 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 according to the North Dakota Multi-Hazard Mitigation Plan Draft 2014. Points were assigned as follows for each dam:

- 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.

The cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna are not impacted by dam failure.

The Nelson County Water Board is in the process of beginning to develop an Emergency Action Plan for the McVille Dam.

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 Nelson County.

Table 4.2.6B Nelson 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
4	0	0	8	Moderate

Loss Estimates
The population at risk can only be better quantified once an estimate of the structures in the inundation areas is known. The amount of warning will vary by the distance from the dam.

It is important to note that the United States Army Corps of Engineers constructed the Tolna Coulee control structure as an added level of protection from a natural uncontrolled overflow of Stump Lake – Devils Lake. The control structure was completed and ready for operation in May 2012. The control structure allows natural erosion of the divide between Stump Lake and Tolna Coulee, while protecting downstream areas from an uncontrolled release of Devils Lake floodwater. The control structure is owned and operated by the North Dakota State Water Commission.

4.2.7 Critical Facilities in Hazard Prone Areas

Like state owned buildings, critical facilities and infrastructure may also be vulnerable to dam failure. More specifically, if in the inundation area, any building is susceptible to damages from flood waters. Other infrastructure, particularly the transportation network, is vulnerable to washouts.

4.2.8 Development in Identified Hazard Areas

Current zoning and land use ordinances in Nelson 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.

4.2.9 Other Key Documents

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	Likely	
Impact	Critical	
Risk Class	B	
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 Nelson 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 occurs when there isn't enough soil moisture to meet the needs of a particular crop at a particular time.
- *Agricultural drought* happens after meteorological drought but before hydrological drought. Agriculture is usually the first economic sector to be affected by drought.
- *Hydrological drought* refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow and as lake, reservoir, and groundwater levels. There is a time lag between lack of rain and less water in streams, rivers, lakes, and reservoirs, so hydrological measurements are not the earliest indicators of drought. When precipitation is reduced or deficient over an extended period 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 Nelson County is 18 inches with about 75 percent of the annual precipitation occurs during the crop season from April to September. The lowest annual precipitation was 7.94 inches in 1936 (North Dakota State Climate Office, 2014)

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.

A number of secondary hazards are generally associated with drought. Rural grassland 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.

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

The geological/physiological distribution of Nelson County is caused by plains, Stump Lake Basin, and major Stream Valleys from Red, Goose and Sheyenne Rivers. Due to the numerous water ways that affect Nelson County, the Nelson County Water Boards is active as well as they participate in the Sheyenne River Joint Board, Upper Sheyenne River Joint Board, Red River Joint Water Resource Board and Devils Lake Joint Board.

Most of the water in Nelson County is from ground water sources. The two major aquifers are the Mcville and Spiritwood. Pierre and Dakota aquifers are also in the county and rural water is also fed from the Fordville aquifer which is actually in Walsh County (Nelson County Soil Survey, 1989) The aquifers 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 townships and cities of the County. There are three rural water districts that have coverage in Nelson County. There is still an area in Nelson County that does not have access in any Rural Water. However, cities and rural residents, mainly farmsteads, do throughout the county receive their water from ground water as depicted in the following tables.

Table 4.3.1B City Water Source

City	Water Source	Aquifer or Purchase Source
City of Aneta	Rural Water	Dakota Rural Water District
City of Lakota	Ground Water	
City of McVille	Ground Water	
City of Michigan	Ground Water	
City of Pekin	Rural Water	Greater Ramsey Water District
City of Petersburg	Rural Water	Tri-County Water District
City of Tolna	Rural Water	Greater Ramsey Water District

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 stream flow conditions are maintained by the US Geological Survey and can be found at http://waterdata.usgs.gov/nd/nwis/rt.

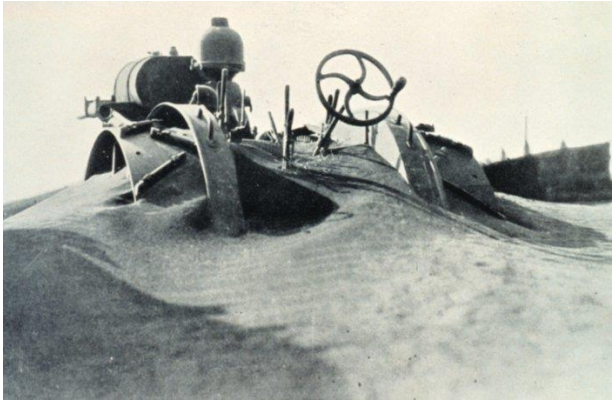


Figure 4.3.2A Dust buried farms and equipment, killed livestock, and caused human death and misery during the height of the Dust Bowl years.
Source: National Weather Service, 1935.

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 and many cattle did not survive. Also approximately 45,000 acres of grassland burned and 50 percent of counties were under burn bans throughout the summer. In Fargo, the clay beneath the City shrunk from lack of moisture leading to cracked sidewalks, driveways and streets.

During this time, the U.S. Bureau of Reclamation assisted several communities with low water levels. At Fort Yates, they assisted in relocating the water intake in 2004, and then installing an interim intake screen, intake pump and an air burst system in 2005-2006 which is still in use. At Parshall, they 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 North Dakota 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
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	Entire State of North	January 1, 2007	Also included impacts from	None	Unknown

Declaration	Location	Date	Magnitude	Casualties	Damages
Secretarial	Dakota	through December 31, 2007	frost, high temperatures, overland flooding, torrential rainfall, severe storms, hail, and high winds.		
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 S3377	Barnes, Benson, Cass, Eddy, Foster, Grand Forks, Griggs, La Moure, Nelson, Ramsey, Ransom, Richland, Steele, Stutsman, Trail, Walsh Counites	July 10, 2012 through September 3, 2012	Also includes impacts from high winds, fire, excessive heat, and insects.	None	Unknown
USDA S3405	Benson, Billings, Cavalier, Dunn, Eddy, Foster, 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.	None	Unknown
USDA S3467	Bowman, Burleigh, Cavalier, Dunn, Emmons, Grand Forks, Grant, Hettinger, Kidder, Logan, McIntosh, McKenzie, McLean, Mercer, Morton, Mountrail, Nelson, Oliver, Pembina, Pierce, Ramsey, Rolette, Sheridan, Sioux, Slope, Stark, Stutsman, Towner, Walsh, Ward,	January 1, 2012 – continuing	Also includes impacts from flood, severe storms, hail, high winds, frost, insects and disease.	None	Unknown

Declaration	Location	Date	Magnitude	Casualties	Damages
	Wells & Williams Counties				
State EO 2012-08	North Dakota	8/14/2012	State declared early-phase agricultural drought emergency		

Source: North Dakota Multi-Hazard Mitigation Plan, 2013

Insured Crop Loss Data

Nelson County has annualized crop losses of $527,939 due to drought during the period 2003-2012. During this period, drought related crop insurance paid $4,698,657 in insurance claims. With 89% of the crop damages insured, crop damages totaled $5,279,390 (USDA Risk Management Agency; 2007 USDA Census of Agriculture).

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	*No regional history*				Statewide Loss of Potable Water	
	No local history					
	100 years			Loss of Public Water Supplies		
	50 years		High Water Users Impacted			
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		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 Nelson County.

4.3.5 Risk Assessment

Vulnerability Overview

Typically, the most profound impact of drought is to the economy. Important sectors of the Nelson 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 $85,369,000 drought can severely diminish profits for the roughly 651 farms and ranches in Nelson County. Over the past 10 years, insured crop losses in Nelson County due to drought have averaged over $500,000 annually.

To determine the overall vulnerability of the impacts of drought to agricultural areas in Nelson 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 2011 North Dakota Crop Insurance Profile Report issued by the USDA Risk Management Agency 89 percent of North Dakota's crops were insured in 2011. The crop exposure value from the 2007 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 Nelson County Drought Agricultural Vulnerability Analysis

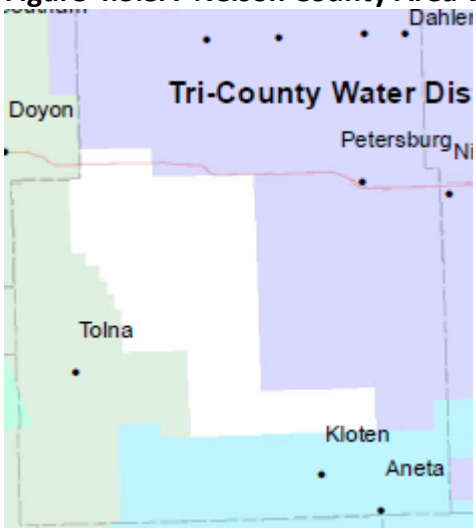
Crop Exposure Value (2007 Census of Agriculture)	Drought-Related Crop Insurance Paid (2003-2012)	Estimated Crop Damages (extrapolated based on 89 percent insured)	Annualized Estimated Crop Damages	Estimated Crop Damage Ratio	Overall Vulnerability
$77,333,000	$4,698,657	$5,279,390	$527,939	0.0068	Low-Moderate

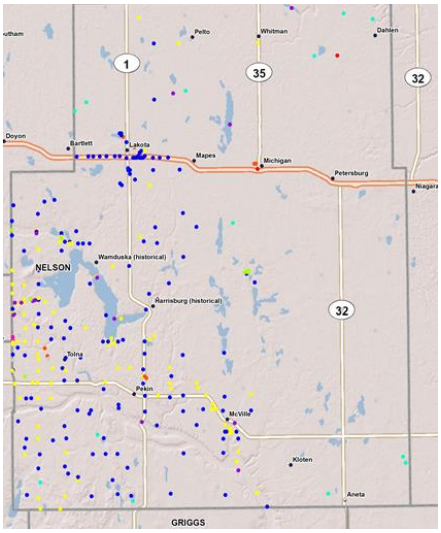
The municipal and farmstead water supply is not considered at risk due to drought. The aquifers that provide water to the county are large and have adequate amounts of water to withstand drought. The two major aquifers are the Mcville and Spiritwood. Pierre and Dakota aquifers are also in the county and rural water is also fed from the Fordville aquifer which is actually in Walsh County (Nelson County Soil Survey, 1989)

The three rural water districts that serve the county have adequate water wells that are tapped into these aquifers. The area that is not served by rural water districts has adequate water wells on the farmsteads.

Figure 4.3.5A depicts that the area in white that does not have rural water, this area has adequate water supplies shown by the active water permits and the number of lakes in the area. Also, the density of farmsteads is less in this area because of the poorer quality of farmland than the rest of the county.

Figure 4.3.5A Nelson County Area Without Rural Water and Nelson County Water Permit Map





Source: ND State Water Commission and ND GIS Hub

The economic impact due to drought is difficult to measure in today's agricultural economy. The majority of farmers enroll in crop insurance because of their large annual crop investments in land, machinery, seed, fertilizer, herbicides and pesticides. As a result, if a drought were to destroy the crop the farmers still realize an income not from the agricultural products but from crop insurance. Crop insurance payments are not as much as the value of a good crop but farmers still have disposable income to spend on personal items and items needed for their farming operation. Implement dealers may be impacted as the purchase of new farm machinery may delayed until moisture conditions improved. However, the only significant implement dealer in Nelson County is in Michigan which serves a broad area of northeastern North Dakota. In conclusion, drought will have an economic impact but due to economic safeguards it will not be as serious as the drought of the 1930's which was accompanied by the Great Depression.

Loss Estimates

Table 4.3.5A in the preceding Vulnerability section provides the annualized estimated crop losses for Nelson 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	- 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	- 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	- Wildland fires - Tree disease - Insect infestation - Impaired productivity of forest land - Direct loss of tress, especially young ones
Agricultural	General economic effects	- 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	- Damage to fish habitat - Loss of fish and other aquatic organisms due to decreased flows
Hydrological	Loss to recreation and tourism industry	- Loss to manufacturers and sellers of recreational equipment - Losses related to curtailed activities: hunting, fishing, bird watching, boating
Hydrological	Damage to animal species	- Reduction and degradation of fish and wildlife habitat - Lack of feed and drinking water - Greater mortality (increased contact with producers) - Disease - Increased predations - Migration and concentration - Increased stress to endangered species - Loss of biodiversity

Drought Type/Severity	Loss Type	Causes
Hydrological	Hydrological effects	- 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	- 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	- Increase in food prices - Increased importation of food (higher costs)
Socioeconomic	Damage to plant communities	- Loss of biodiversity - Loss of trees from urban landscapes, shelterbelts, wooded conservation areas
Socioeconomic	Health and values	- 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

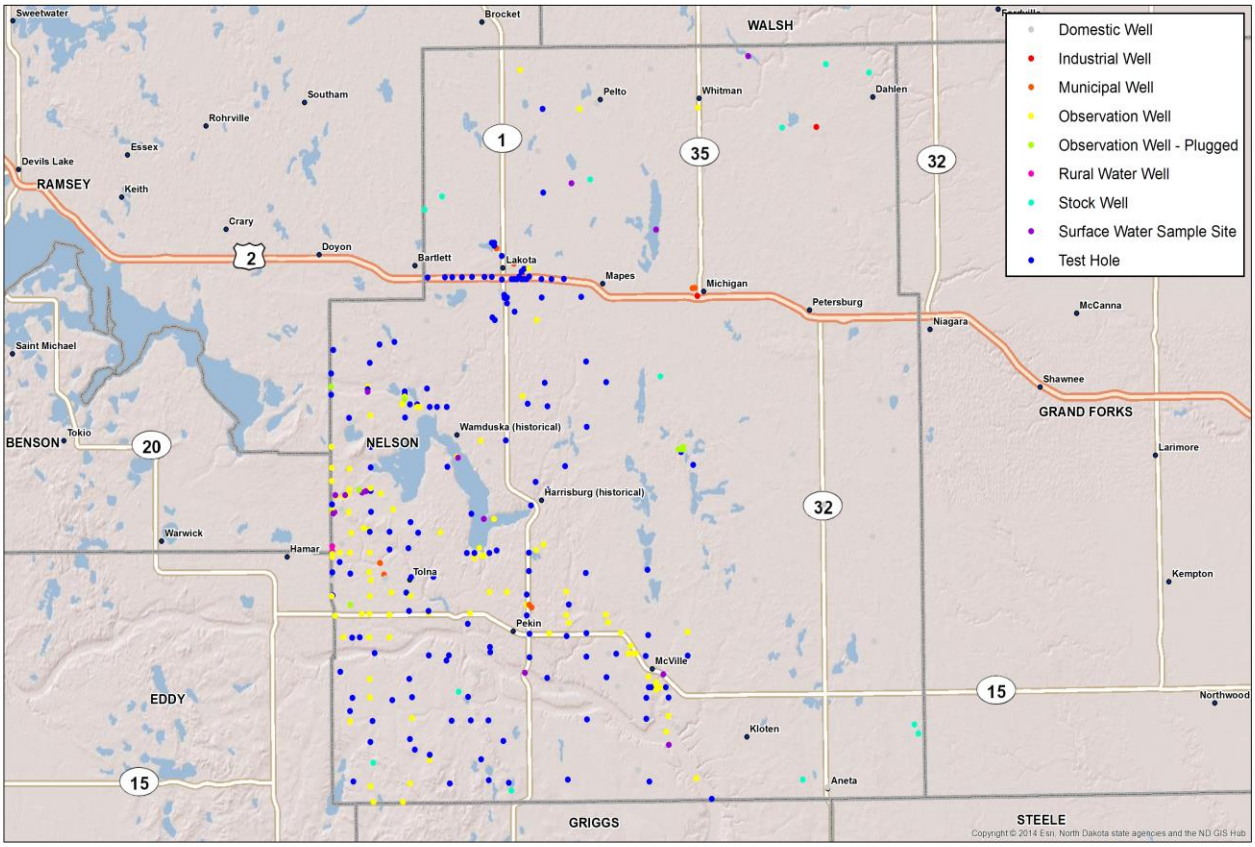
4.3.6 Critical Facilities in Hazard Prone Areas

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. Acquifers in Nelson County have water supply intakes for municipal, industrial, and irrigation purposes. Low water levels can cause operations to cease and damages to systems can occur. Such problems can have serious consequences for municipal water supplies, agriculture, and other critical industries. Figure 4.3.6A is a countywide listing and type of active water permits.

Figure 4.3.6A, Active Water Permits

Permit	Name	Use Type	Status
1075	WALSH COUNTY WATER RESOURCE DIST.	Recreation	Perfected
1151P	MCVILLE, CITY OF	Municipal	Perfected
1228	ANETA, CITY OF	Municipal	Perfected
1247	MICHIGAN, CITY OF	Municipal	Perfected
1572	GALDE, LLOYD	Recreation	Perfected
1796	ENSRUD, KENT	Recreation	Perfected
1889	LUNDEBY, FRED	Irrigation	Perfected
2818	ALTENDORF AND BJORNSTAD FARMS	Irrigation	Perfected
2995	LAKOTA, CITY OF	Municipal	Perfected
3033	LUNDEBY, FRED	Irrigation	Perfected
3135	ALTENDORF AND BJORNSTAD FARMS	Irrigation	Perfected
3207	PEKIN, CITY OF	Municipal	Perfected
3591	GREATER RAMSEY WATER DISTRICT	Rural Water	Perfected
4160	ALTENDORF, MARTIN AND MARVIN	Irrigation	Perfected
4185	MCVILLE, CITY OF	Municipal	Perfected
4533	NELSON COUNTY PARK BOARD	Irrigation	Conditional
4607	WILLIAMS, LEE	Fish and Wildlife	Perfected
4676	GREATER RAMSEY WATER DISTRICT	Rural Water	Conditional
4933	ALTENDORF AND BJORNSTAD FARMS	Irrigation	Perfected
4999	MESSNER, DOUGLAS N.	Irrigation	Conditional
5133	ALTENDORF AND BJORNSTAD FARMS	Irrigation	Perfected
5516	GREATER RAMSEY WATER DISTRICT	Rural Water	Conditional
5638	GREATER RAMSEY WATER DISTRICT	Rural Water	Conditional
5751	DEVILS LAKE, CITY OF	Municipal	Conditional
5845	LAKOTA, CITY OF	Industrial	Conditional
5887	HANSON, LESTER A.	Irrigation	Conditional
5888	HANSON, LESTER A.	Irrigation	Conditional

Figure 4.3.6A Active Water Permits



Source: ND GIS Hub, 2014

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.

4.3.7 Development in Identified Hazard Areas

Discussions are in progress to route water from Lake Sakakawea to the Red River Valley for irrigation use. The U.S. Army Corps of Engineers and the North Dakota State Water Commission are leading the project.

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	Highly Likely	Nearly 100% probability in the next year
Impact	Critical	More than 50% of jurisdiction affected
Risk Class	A	High Risk Required prompt action Address via Mitigation and Contingency Plans
Seasonal Pattern	Late March to late April, throughout summer for flash flood	
Duration	1 week to 10 days	
Speed of Onset	Hours if flash flooding, days is seasonal spring flooding	

4.4.1 Description

Flooding needs special attention in the Nelson 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 Nelson County's most costly and repetitive natural hazard as evidenced by the number of flood disasters experienced in Nelson County. Nelson County has a moderate risk rating for flooding.

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 Nelson 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. The farmsteads are built on higher land therefore are not subject to flooding. Through the years Nelson 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 Nelson County cities of Aneta, Lakota, McVille, Pekin, Petersburg, and Tolna 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.

Michigan is in a unique situation. Michigan constructed a ditch to drain excess water from the city, especially the golf course, to Lake Laretta. Since 1993 consistent above normal precipitation has caused Lake Laretta to rise causing a backflow of Lake Laretta to the City of Michigan. The city has constructed a low level structure to prevent the backflow from occurring which in turn prevents excess water draining from Michigan.

On a larger scale, the Michigan situation is in the process of being mitigated through the Michigan Spillway Project which will drain excess water from northern Nelson County, including Lake Laretta. The Michigan Spillway Project protects an area of 40,000 acres of land and 24,000 water surface acres. The area includes the City of Michigan and portions of Michigan, Rubin, Enterprise, and Sarnia townships. Infrastructure including, streets, homes, township and county roads and farm/ranch access and farmland flooding is prevented through a managed discharge plan. The project is designed to protect downstream impacts and the prevention of invasive species migration. The project open channel portion is completed as of December 1, 2014 while the pump station will be completed in June, 2015. In the interim temporary pumps will be operational. Project funding has been through the State Water Commission, State Legislature, Joint Water Board, and local assessments. No federal funds were involved in this project. This project is approved by the North Dakota State Water Commission and the United States Corps of Engineers and other agencies.

The Hazard Mitigation Planning Committee agreed there may be flooding incidents that occur that can be solved through mitigation actions.

Types of Flooding

Several different types of flooding occur in Nelson County; they include Riverine Flooding, Closed Basin Flooding, Ice Jam Flooding, Flash Flooding, and Groundwater Flooding. The spring flood danger period is generally from late 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. Nelson 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 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. Nelson 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. Nelson County has 34 people, 34 buildings with a building value of $4,104,000 and an estimated content value of $2,052,000 bringing the total value to $616,000,000. This gives Nelson County a low-moderate vulnerability rating for riverine flooding confirming the earlier statement that with the number of flood disasters in Nelson County; Closed Basin Flooding is the primary cause of flood damages in Nelson County. The locations of the 34 affected structures can be found in the DFIRM Maps in Appendix E. The DFIRM Maps show the vulnerability to flooding in western Michigan (Golf Course) and structures in extreme eastern Michigan. In Petersburg the DFIRM Maps show the flooding vulnerability in western, northern, and southern parts of town. There are no structures in these areas. The cities of Aneta, Lakota, McVille, Pekin, and Tolna do not show flooding risk according to the DFIRM Maps.

Source: FEMA DFIRM, Preliminary DFIRM, and Q3 Data; HAZUS MH 2.1

Closed Basin

Unique to North Dakota is flooding due to closed basin circumstances; in a closed basin, surface water cannot flow naturally out of the basin as a river does (until a certain elevation is reached), and therefore, during wet periods, normally dry locations can fill in with water. Nelson County has numerous small closed basins caused by glaciation which have flooding issues. Closed Basin Flooding is the primary cause of flood damages in Nelson County. The most prominent of the closed basins are the Devils Lake/Stump Lake System, McHugh Slough and Lake Laretta. Devils Lake/Stump Lake will be discussed at length later in this section.

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. Nelson County can have ice jams developing as water moves from one closed basin to another and in the rivers and small streams found in Nelson County.

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 Nelson 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, Nelson County has experienced 13 flash flood events causing $2,063,500 of

damage. Source: National Climatic Data Center, data downloaded on 5/22/2013, 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 Nelson County is subject to ground water flooding. Numerous rural areas within Nelson County have high water tables which cause ground water flooding.

Table 4.4.1.1 Nelson County Flood Occurrences

Flood Type	History	Recurrence	Typical Impacts
Riverine/Overland Flooding	42 flood events in 18 years (1996 to 2014)	Averages over two events each year	Roads Bridges Sewer Systems Homes Businesses Public Facilities Electricity Agriculture
Flash Flood	13 events listed in 18 years	Averages nearly one event per year	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

Nelson County Major Drainage Basins

Nelson County is located in the Red River Watershed Drainage Basin. However, Nelson County is characterized by a combination of glaciated landforms and lake plains represented by lakes and small wetlands, commonly referred to as prairie potholes which present a special challenge in assessing flood hazard. These lakes and prairie 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 Red River tributaries.

The Red River Basin is the most populated basin of the state. The Red River is the principal river of the basin. It serves as the border between North Dakota and Minnesota and winds nearly 400 river miles from

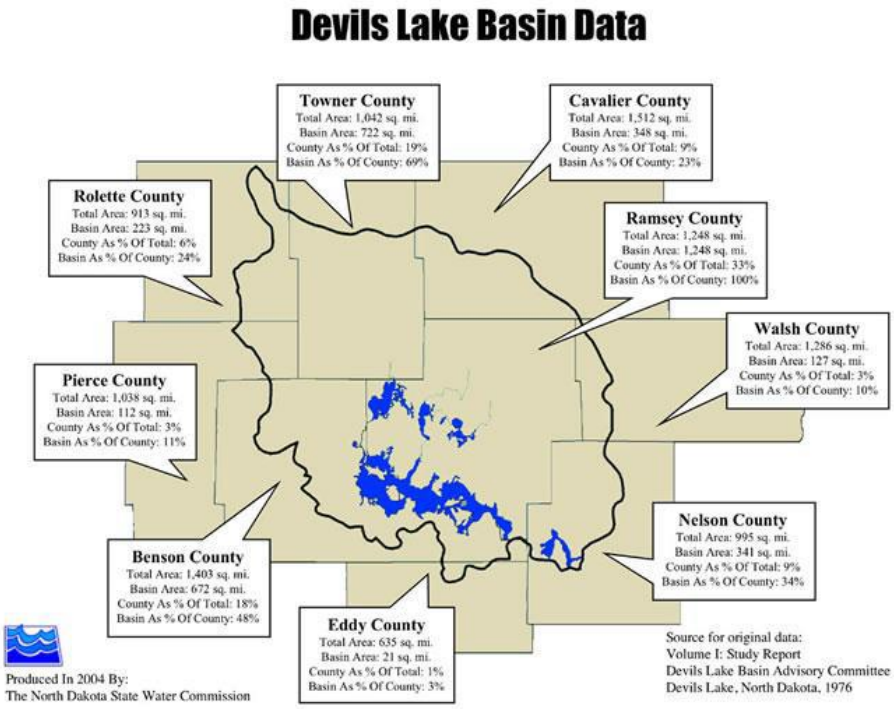
its origin at the confluence of the Otter Tail and Bois de Sioux Rivers at Wahpeton, North Dakota and Breckenridge, Minnesota, north to the Canadian border. The Red River continues to flow about 155 river miles to Lake Winnipeg in Manitoba. Annual mean precipitation varies from 17 inches in the western portions of the basin to 22 inches in the southeastern portion. The Red River Basin has suffered numerous major floods since the first recorded event in 1882. Flood damage to crops and pastures has been considerable. Often, major spring flooding causes delay in planting; thus, the growing season is cut short for appropriate crop maturation. The eastern one-third of Nelson County flows east through tributaries into the Red River. The major Red River tributaries that flow through Nelson County are the Sheyenne River, Forest River, and the Goose River. The western one-third flows into the Stump Lake and Devils Lake sub-basins and outlets through the pump outlet into the Sheyenne River. The southern one-third of Nelson County flows directly to the Sheyenne River.

The Devils Lake Basin under natural conditions is a non-contributing sub-basin within the Red River drainage system drains the northern and western portions of the county. The Devils Lake Basin became a closed basin after the last continental ice sheets receded and southerly drainage to the Sheyenne River ceased. The drainage system of the basin is formed by chains of waterways and connecting lakes, with the majority of the water ultimately flowing into Devils Lake which is overflowing into Stump Lake. Three outlets for Devils Lake/Stump Lake have been built making the Devils Lake Basin a contributing factor to the Red River. The control structure placed in the Tolna Coulee is to protect downstream regions of the Sheyenne River Valley. Eighteen feet of aged sediment has been found going back 1,000 years and is vulnerable to erosion during a large flood event that could flow 16,000 CFS (cubic feet per second) downstream causing considerable damage to property.

Figure 4.4.2A Red River Drainage Basin

Source: http://www.rrbdin.org/wp-content/uploads/2011/12/IWT-RRB-Map.png

Figure 4.4.2B Devils Lake Basin (Counties and Sub-Basins)



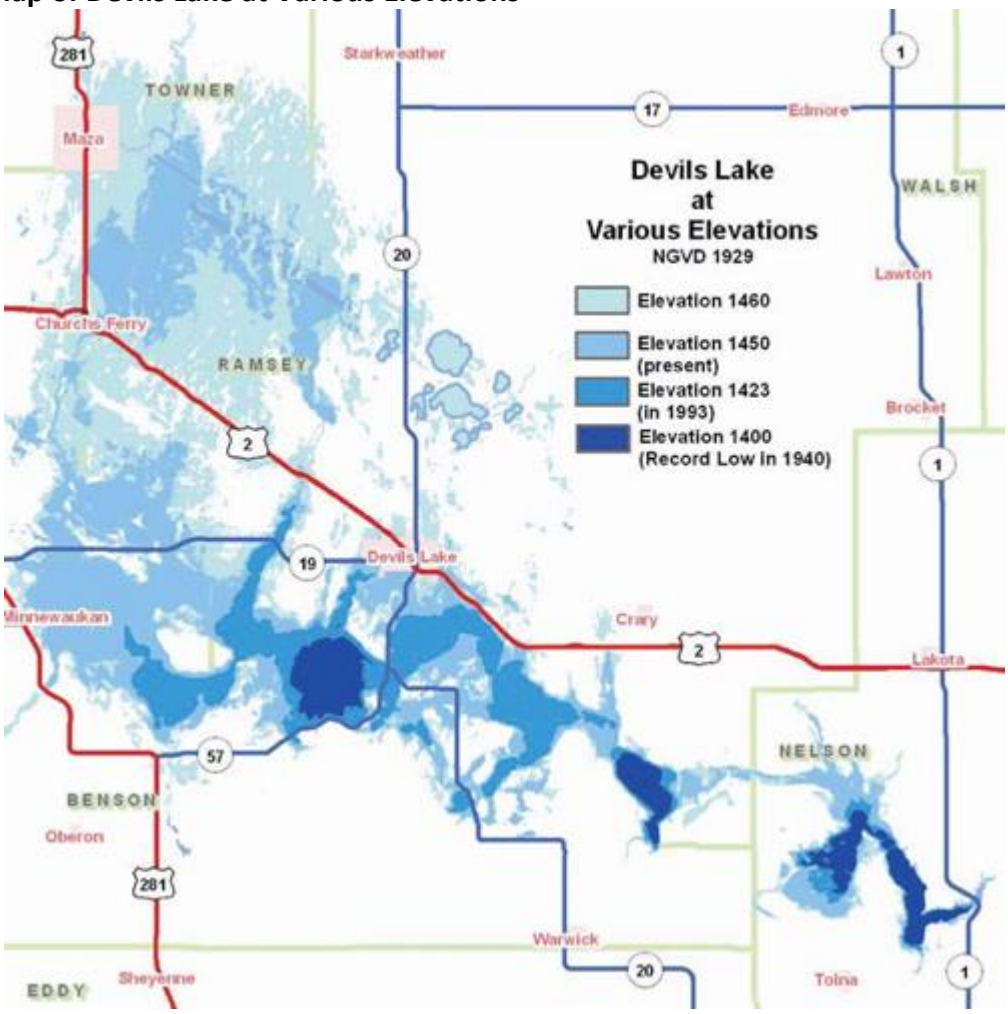
Source: North Dakota State Water Commission, 2004, retrieved from http://www.dlbasin.com/

The water levels of Devils Lake fell 37.5 feet between 1867 and 1940. Since 1940, the trend has reversed. Between February 1993 and June 1999, the lake rose approximately 22 feet, thereby tripling the volume of water in the lake. The lake area expanded from 42,000 acres in 1993 to 82,200 acres in 1996. These increases created significant concerns from land and property owners in the area. In addition, as the lake level changes, so do water quality parameters. Lower water levels are generally associated with a very high total of dissolved solids. Devils Lake is the largest natural lake in North Dakota.

The basin's topography contributes greatly to the flooding problems experienced in the area. Much of the region's land is rolling; but the general slope is relatively flat. Small streams, shallow lakes, and numerous wetland depressions are typical. Agricultural development is extensive and much of the flood damages are agricultural in nature. At its current elevation, Devils Lake covers approximately 204,000 acres, or 318 square miles.
The major flood problems in the Devils Lake Basin are due to a wet cycle (extended period of time of wetter than average weather) that has lasted for over 20 years. The potential increase in the water level of the Devils Lake Basin presents a flood threat to substantial amounts of public, commercial, and private development. On the other hand, low levels, especially on Devils Lake itself, have an extremely negative impact on the highly visible sport fishing industry that exists in the basin. Soil erosion is a serious problem contributing to sedimentation and nutrient enrichment of area streams and lakes. Land management to enhance agricultural production versus wetland preservation is also a major concern in the basin.

Even though Devils Lake is considered a closed basin, the lake does have a natural outlet into Stump Lake when lake levels reach 1,446‘ msl. Then, at 1,458‘ msl, the combined lakes flow into the Sheyenne River via the Tolna Coulee. If the lake continues to rise until the outflow balances the inflow, the elevation is estimated to be about 1,463‘ msl at the west end of the lake with an approximate surface area of 354,000 acres (553 square miles). (Federal Emergency Management Agency, 2006)

Figure 4.4.2C Map of Devils Lake at Various Elevations



Devils Lake/Stump Lake at Various Elevations

Closed basin flooding is unique when compared to standard riverine flooding because river levels tend to rise rapidly and the flood has a duration of days to weeks, whereas, closed basin flooding like Devils Lake occurs relatively slowly and can last for years or indefinitely. The flood problems are compounded by wave action on the lake. As a part of a strategy for identifying a more permanent comprehensive solution to flooding in the Devils Lake Basin, a comprehensive risk assessment of known flooding potential was conducted in partnership by the Federal Emergency Management Agency and the State of North Dakota. The objective was to develop a product that is user-friendly, easily accessible to a wide range of users, and one that could be easily maintained and managed. Data consists of roads, structures, sewer systems,

transmission lines, pump stations, treatment facilities and electric systems. Features of the risk assessment include a structure inventory, GIS overlays, infrastructure feature descriptions such as road names and utility ownership, one-foot contour elevations, aerial photography, LIDAR elevation data, and zoom in and out capability. The Devils Lake Risk Assessment, completed in 2000, is now considered out-of-date, but current and future projects look to build upon the work that was done. This tool was most useful for identifying which infrastructure and private property was at greatest risk when lake levels raised. Source: State of North Dakota 5.89 2014 Multi-Hazard Mitigation Plan

Three major steps have been implemented to control the flooding of the Devils Lake/Stump Lake complex.

- Continued to implement the state's three-pronged approach to solving the Devils Lake region's flooding problems, including: infrastructure protection, upper-basin water management, and operation of the state's emergency outlets.
- Completed a 350 cubic feet per second (cfs) $70 million emergency outlet from East Devils Lake in the summer of 2012. The maximum total discharge of the previously existing west, and new East Devils Lake outlets is now 600 cfs.
- Completed a Tolna Coulee Control Structure in the summer of 2012 to reduce the risk of a catastrophic natural overflow of Devils Lake. The control structure was developed in cooperation with the U.S. Army Corps of Engineers. That project is now owned and operated by the SWC.

Source:
http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubCategoryPDF/151/Water%20Development%20Report.pdf

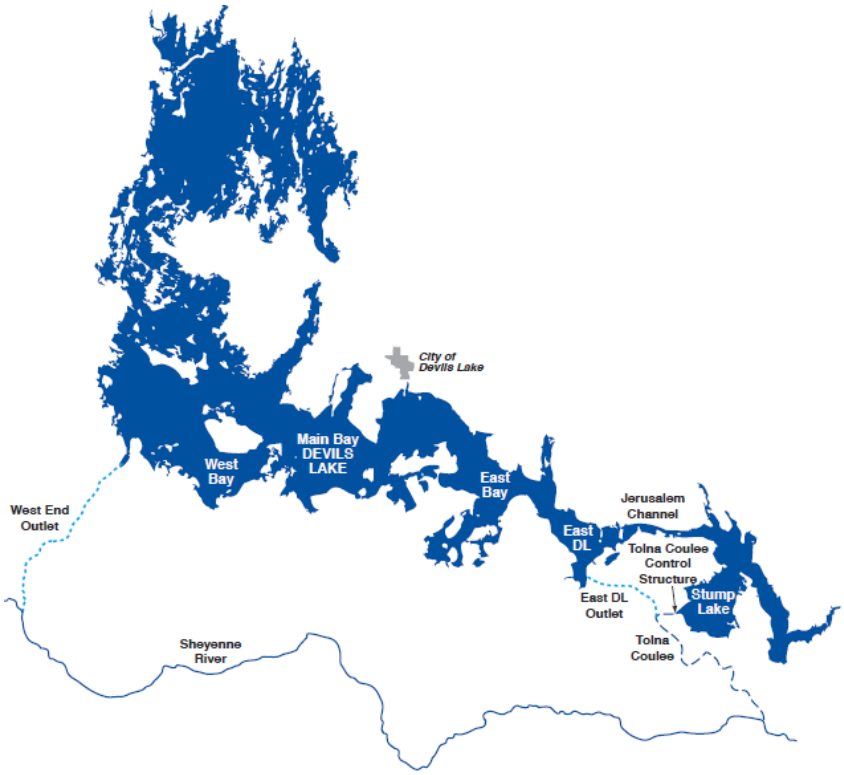


Figure 4.4.2D Devils Lake/Stump Lake Outlets

4.4.3 Flood Damages

As history has shown, essentially all jurisdictions in Nelson 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 Nelson County is vulnerable to flood damage due to the Closed Basin Flooding that occurs in Nelson County. Critical structures (sewer, water, pump stations) located throughout the Cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna would be affected by ground saturation and overland flooding in low lying areas.

Slow-rising 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 Nelson 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 leading to an average of nearly two deaths per year in the state from flood. (Source: North Dakota Hazard Mitigation Plan, 2014)

Flooding regularly affects the agricultural areas of Nelson 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.

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.

Public Infrastructure Flood Damages

There have been 16 Presidential Disaster Declarations due to flooding since 1989. More recently, since 2009, Nelson County has received four 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	43	$527,411
DR 1907	2010	30	$446,259
DR 1981	2011	43	$930,396
DR 4128	2013	8	$445,224

Source: ND Department of Emergency Services

Flood Property Losses

In 2009-2010 FEMA conducted a HAZUS 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 Nelson County are estimated to be $20,000 based on this study. Nelson County has a low loss rating as depicted by the table below.

Table 4.4.3.2 Nelson County Losses

Business	Residential		Commercial		Other		Total			
Disruption	Building	Contents	Building	Contents	Building	Contents	Building	Contents	Total	Loss
($)	Loss	Loss	Loss	Loss	Loss	Loss	Loss	Loss	Losses	Rating
$2,000	$1,000	$0	$0	$3,000	$2,000	$12,000	$3,000	$15,000	$20,000	Low

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 Nelson 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-2007 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
$77,333,000	$58,235,167	$5,823,516.70	$6,543,277.19	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.

Table 4.4.4.1 Communities in Nelson County Participating in the NFIP

Jurisdiction	CID#	Entry Date	Mapped
City of Aneta	3980155	1/17/75	NSFHA*
City of Lakota	380075	12/26/75	NSFHA*
City of Michigan	380076	1/10/75	2/18/09
City of Petersburg	380194	1/17/75	2/18/09
Nelson County	380683	5/2/95	2/18/09

*A NON-SPECIAL FLOOD HAZARD AREA (NSFHA) IS AN AREA THAT IS IN A MODERATE-TO-LOW RISK FLOOD ZONE (ZONES B, C, X PRE- AND POST-FIRM). AN NSFHA IS NOT IN ANY IMMEDIATE DANGER FROM FLOODING CAUSED BY OVERFLOWING RIVERS OR HARD RAINS.

Nelson County has entered into the FEMA flood protection program. Local residents indicated that flooding has been a consistent problem. Nelson County has 10 flood insurance policies with $1,228,700 of coverage. Since 1978 there have been 40 claims paying out $862,857.

Nelson County had three repetitive loss properties that have been resolved. One was bought out, the other two were moved out of the flood plain. Currently there are no repetitive loss properties in Nelson County.

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	*No regional history*					
	No local history				Event Similar to 1997 Flood	
	100 years					
	50 years	Waterways Reaching Bankful	Flood with Some Road Damages	Flood Impacting Communities		
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		Impact				

Considering the extensive history of flooding in Nelson County, this history will be used to express the probability and magnitude of floods in the state. Table 4.4.4B provides this data for Riverine, Flash and Ice Jam Flooding.

4.4.6 Risk Assessment

Vulnerability Overview

As history has shown, Nelson 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 Nelson 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 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.

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. Although this fund does not typically provide insurance for flood losses, some payments were made as a result of the devastating flooding in 1997. Table 4.4.6A summarizes claims paid by the fund to local government critical facilities, National Guard facilities, state-owned universities and school districts due to flood in Nelson County.

Table 4.4.6.2 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.

One structure that has a unique historical and cultural significance is the Pavilion at Stump Lake Park. This structure was built in 1922 and has served as a gathering place for Nelson County residents for generations. Events including roller skating, dances, family gatherings, and other community events are held there for nearly 100 years. As the Stump Lake water level begin to rise about 20 years ago from Devils Lake overflow through the Jerusalem Coulee, wave action erosion and the rising water table threatened the pavilion. Nelson County officials mitigated the problem by constructing a Hesco Barrier and filling in the pavilion basement. The Tolna Coulee Outlet stabilized Stump Lake's water level and reduced the risk, however the

lake is still considered a serious threat to the peninsula upon which the Pavilion sits due to the severe erosion caused by large wave action. The erosion threatens not only the pavilion but also the beach, the baseball/softball diamond, and is undermining large trees. The situation must be monitored closely.

Figure 4.6.A, Stump Lake Pavilion

Other critical facilities that support government services and private utilities may also be located in flood hazard areas. Damages to such facilities may seriously disrupt emergency and essential services.

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
- The Red River of the North Flood Disaster, 10 Years Later
- Interagency Hazard Mitigation Team Reports

4.5 Hazardous Material Release

Frequency	Possible	
Impact	Limited	
Risk Class	C	
Seasonal Pattern	None	
Duration	Averages 1 to 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.

The Federal Motor Carrier Safety Administration has nine categories of hazardous materials that are:

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

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 Nelson 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. Another hazardous material transporter is the railroad.

Fixed Facility Locations

In 2013, there were 29 Tier II reporting facilities housing or using hazardous chemicals in Nelson County identified by the Community Right to Know Act. Table 4.5.1A list all Tier II reporting facilities in Nelson County. 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.

Table 4.5.1.A Hazardous Materials (Tier II) Facilities

Company	Storage of Extremely Hazardous Substances	Address	City
D&M Service	No	214 Main Street & Hwy 15	McVille
Dahlen Farmers Elevator & Oil Company	Yes	218 North Main	Dahlen
Nelson County Highway Department	No	213 W McDougail Ave	McVille
SSAG Warehouse	Yes	419 1ST Ave	Petersburg
Petersburg Oil Corporation Bulk Plant	No	41 121 Ave NE	Petersburg
Petersburg Oil Corporation-Main	No	125 South 5TH Street	Petersburg
Tri-County Petroleum	No	2402 112 Ave NE	McVille
Lakota	No	East A Ave	Lakota
Lakota Substation	No	10427 42ND Street NE	Lakota
Pekin Coop Elevator Co.	Yes	PO Box 427	Pekin
Ferrell Gas Lakota	No	103 2ND Street NE	Lakota

FUOC McVille	No	11182 Highway 15 West	McVille
CHS McVille- McVille	No	100 Southwest Highway 15	McVille
CHS McVille-Aneta	No	223 BN Drive	Aneta
CHS McVille-Kloten	No	Railroad Ave	Kloten
Lake Region Grain Cooperative-Michigan	No	111 Broadway South	Michigan
Lake Region Grain Cooperative –Lakota Cargill	Yes	301 1st Ave SW	Lakota
CPAS –McVille NH3	Yes	100 SW Hwy 15	McVille
CPAS-Aneta	Yes	223 BN Drive	Aneta
FUOC Tolna	No	110 Main Street South	Tolna
NDDOT Pekin	No	205 Main Street South	Pekin
NDDOT Michigan	No	519 South Street	Michigan
Tronson Grain LLC-Lakota	No	216 East A Ave	Lakota
Tronson Grain LLC-Tolna	No	Railroad Ave	Tolna
Nelson County Pig Cooperative	No	4450 111th Ave NE	Lakota
Michigan Amoco-Main	No	205 5th Street West	Michigan
Michigan Amoco-Bulk Plant	No	103 Front Street East	Michigan
Farmers Union Oil Co.	No	113 South Street East	Michigan
TransCanada Pump Station	No	3520 124th Ave NE	Niagara (Alder Township of Nelson County)

In 2013, there were 6 facilities housing extremely hazardous chemicals in Nelson 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, Nelson County had a total of 63 miles of hazardous liquid pipelines which is crude oil. Nelson County does not have any gas transmission lines.

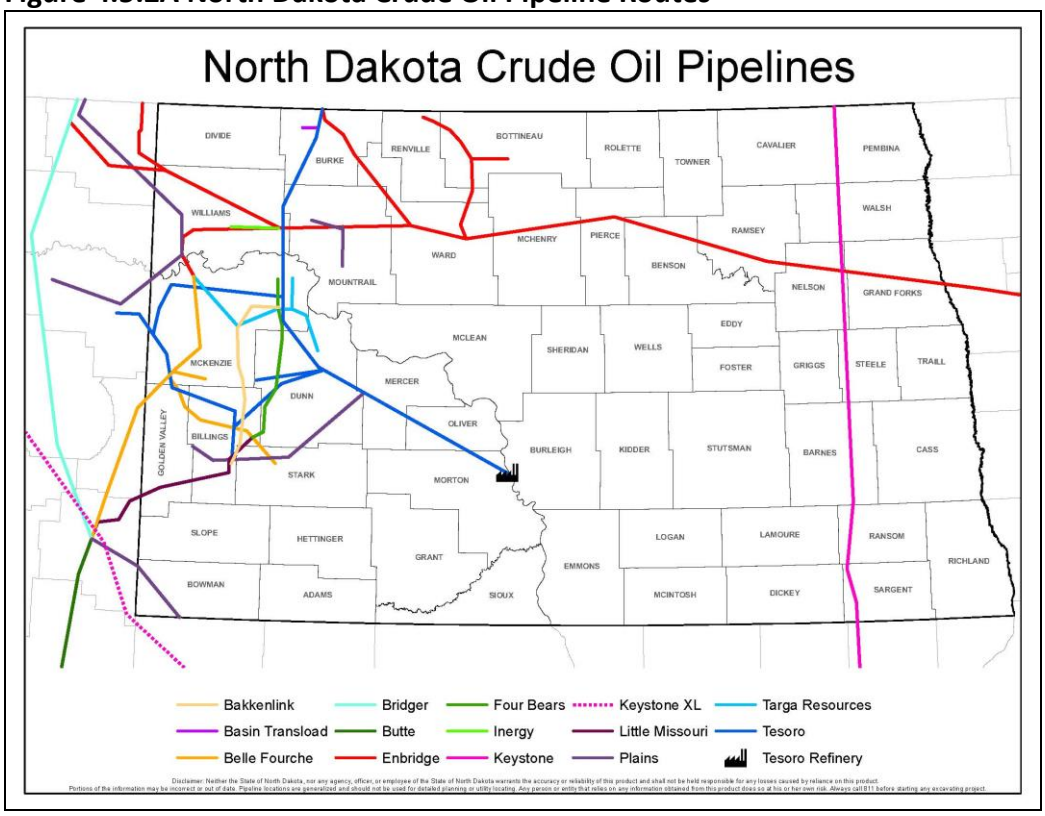
All mileages are for 2014 which must be noted as Nelson County is included in the route for the Sandpiper Pipeline being constructed in the near future to carry crude oil from the Bakken Oil Field to terminals in Minnesota.

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 the crude oil pipelines that show two pipelines actually intersect in Nelson County – one traveling north and south and the other east and west. Together, they have 63 miles of pipeline. Currently, there are no gas transmission pipeline miles in the county.

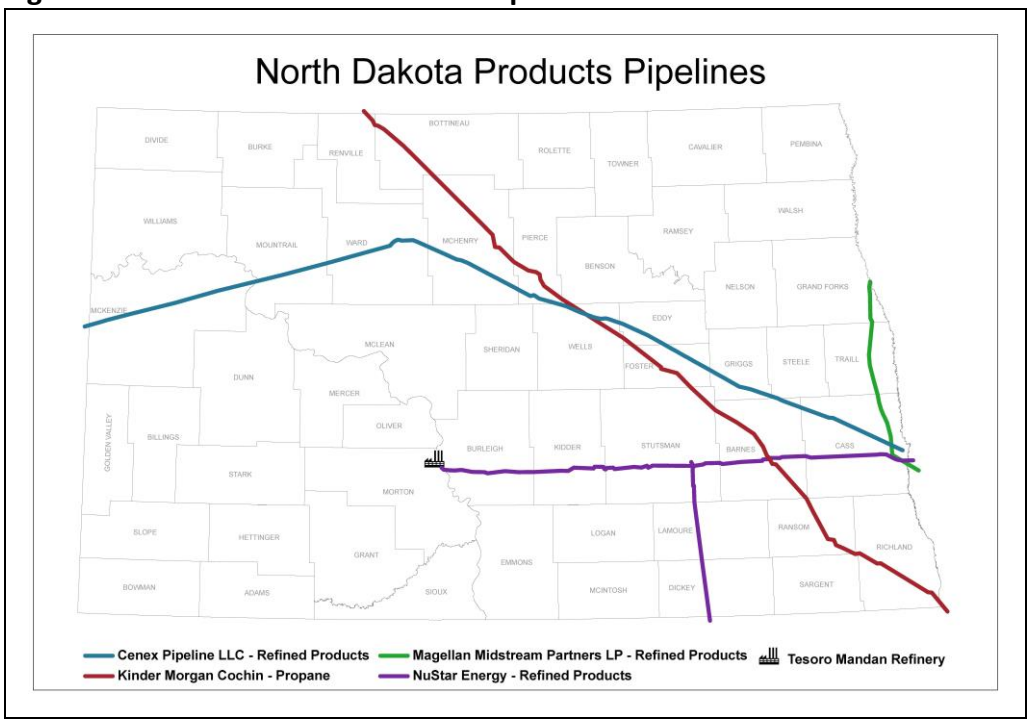
In Nelson County, affected cities are Lakota, Michigan, and Petersburg.

Figure 4.5.2A North Dakota Crude Oil Pipeline Routes



Source: ND Pipeline Authority, 2014

Figure 4.5.2B North Dakota Product Pipeline Routes



Source: ND Pipeline Authority, 2014

Figure 4.5.2C Nelson County Transportation Routes

Source: ND GIS Hub, 2014

4.5.3 Previous Occurrences

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

Table 4.5.3A Nelson County Hazardous Materials Spills

Incident ID	Date Reported	Incident Date	Contaminant	Volume/Units
EIR1855	2013-01-24	2012-07-02	Petroleum Products (Diesel Range and Gasoline Range Organics)	
EIR1316	2010-10-26	2010-10-26	Diesel	60 gallons
EIR962	2007-10-29	2007-10-27	anhydrous ammonia	4000 pounds
EIR876	2006-10-23	2006-10-23	Mineral Oil	12 gallons
EIR452	1999-11-23	1999-11-22	Hydraulic Oil	45 gallons
EIR312	1988-03-24	1988-03-22	Diesel fuel	450 gallons
EIR372	1979-01-15	1979-01-13	Diesel Fuel	1442 gallons

Source: North Dakota Department of Health - http://www.ndhealth.gov/EHS/Spills/ , 2014

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, Nelson County has had no fatalities or injuries over the period of 2003 - February 2013.

Table 4.5.3B Nelson 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	*No regional history*				Nuclear Release in an Urban Area	
	No local history			Hazardous Plume in an Urban Area		
	100 years		Release Requiring Large Evacuation			
	50 years	Spill Requiring Response				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		Impact				

Since 1975, only seven reports of hazardous material incidents have been documented in Nelson County to the State Department of Health. Based on this history, there is a likelihood that not every year a hazardous material releases can be expected Nelson County. 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 Nelson 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, special needs 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, 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 Nelson 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 NDDES in 2012, the miles of gas transmission and haz-mat 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 Nelson County. Nelson County's rating is low which is similar to other mainly agricultural based counties that are not along an interstate.

Table 4.5.5A Nelson County Hazardous Materials Vulnerability Analysis

# of Tier II Facilities	Tier II Facility	# of Reported Incidents to NDDES 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

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. Nelson County would have mutual aid from the two teams in the northeast located at either Grand Forks 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 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 Nelson 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	
Impact	Critical	
Risk Class	B	
Seasonal Pattern	None	
Duration	Unknown	
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.

Terrorism using explosive and incendiary devices 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.

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 Grand Forks County, there is the Grand Forks Air Base that used to house many nuclear missiles that have now been removed; now all that remains is minimal staff and empty silos. In spite of this, the base may still pose a "threat" to other countries and also may become a target during times of international unrest.

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 facilitat4e 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 who, 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 is 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 established 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 Nelson County, this would include the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna.

4.6.3 Previous Occurrences

Fortunately, Nelson 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.

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 Dzohkar Tsarnaev. Tamerian Tsarnaev was killed in a confrontation with police and Dzohkar 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)

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:

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.

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.

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 Nelson 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. Nelson 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.

October 2011 – In Harwood, racist sayings, swastikas and anarchy symbols were written on the city hall, a residence, several street signs, and numerous vehicles, including school buses.

September 2011 – In Grand Forks, replacement workers and security workers were allegedly called racial slurs by union supporters outside a sugar plant. A monkey-like figure hanging from a noose attached to a large inflatable rat was also hung outside the plant.

June 2012 – In Grand Forks, a threatening anti-gay epithet was written on the back window of a car that had rainbow bumper stickers, which sometimes symbolize gay pride

Summer 2014 – In Cass County, the courthouse was vandalized.

Table 4.6.2A Nelson 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	*No regional history*			Bombing of Large Building	Statewide Nuclear Attack	
	No local history					
	100 years	Disruptive Strike	Multiple Victim Shooting			
	50 years					
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		Impact				

The probability of a homeland security incident affecting Nelson 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 Nelson County, but even the probability of such an attack elsewhere is unknown and is the subject of much 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 Nelson 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 Nelson 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. Nelson County was determined to have less than a 1.25 tier from this 2002 assessment. This is the lowest rating possible. Only ten counties/tribes in the county were found to have this low tier assessment.

Lakota has the highest vulnerability because it is the County Seat and the County Courthouse may be targeted by people with extremist views and it is located on US Highway 2, a major highway in the northern states. Other communities along US Highway 2 include Petersburg and Michigan. Aneta, McVille, Pekin, and Tolna are not as vulnerable because they are located on state highways with less traffic.

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 Nelson 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, Nelson 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 Nelson County population.

4.6.6 Critical Facilities in Hazard Prone Areas

The North Dakota Critical Infrastructure Program (CIP) at NDDES 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. Nelson County has some of the fewest CIKR facilities of counties in North Dakota.

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

Food/Agriculture	Energy	Public Health	Transportation	Emergency Services	Communications	Water	Total
0	0	2	1	1	1	0	5

Source: North Dakota critical Infrastructure Program, 2013

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

Nelson County has had only $9,621 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	
Impact	Critical	
Risk Class	B	
Seasonal Pattern	None-Highest probability of occurrence is during or after another hazardous incident that has somehow depleted resources	
Duration	Days to weeks	
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 Nelson 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 utility, communication, and fuel services for everyday life and basic survival. Many in Nelson County depend on the typical utility and communication infrastructure such as water, sewer, electricity, propane, natural gas, telephone, internet, and gasoline. 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 Nelson County. The nearest storm affected Montreal, Canada 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, and telecommunications.

In Nelson County, this would include the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna.

4.7.3 Previous Occurrences

North Dakota, and subsequently Nelson 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. This put additional strain on the northeast region of the State to include flooded Nelson 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 Nelson 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: occur that the utility companies classify as major events. These events will vary in magnitude and duration, most of them have been weather related, ice, wind, tornado are the common causes, most occur between October 1 and June 1 however summer wind storms and tornados are also relatively common. Other causes for these events include accidents, vandalism, and terrorism.

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 4.7.2A North Dakota (including Nelson 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	*No regional history*				Statewide Loss of Food or Water	
	No local history					
	100 years		Fuel Rationing	Extended Winter Power Outage		
	50 years	Short Lived Power Outages				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		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 Nelson 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.

Nelson County is determined to be at a low risk for shortage or loss of critical materials/infrastructure. However the risk is greater than it appears on the surface. Nelson County has Grand Forks City 50 miles to the east and Devils Lake City 40 miles to the west which have a significant population of native Nelson County people. If a significant storm hits the region such as the April 1997 Blizzard that causes power outages and lack of utility services, people living in Grand Forks and Devils Lake have been known to evacuate those cities to return to their “roots” in Nelson County for support. Nelson County with its rural population does not have the resources to shelter and provided services (food, medicine, housing, and clothing) to a large evacuated population.

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 Nelson 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. Nelson County has a "low" risk to shortage or outage of critical materials or infrastructure due the county population size (over 27,001).

Lakota and McVille are the two most vulnerable cities in Nelson County to shortage/outage of critical materials. Lakota's vulnerability is raised because it is the County Seat and has the highest population and McVille has the County Hospital. The cities of Aneta, Michigan, Pekin, Petersburg, and Tolna share the vulnerability equally.

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.

Table 4.7.5A Electrical Providers

	Nodak Electric Cooperative	Western Area Power	Ottertail Power Company
Aneta			X
Lakota	X	X	
McVille			X
Michigan	X		X
Pekin			X
Petersburg			X
Tolna			X
Rural Nelson County	X		

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	Likely	
Impact	Critical	
Risk Class	B	
Seasonal Pattern	Summer-June to August	
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 eastern 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.

<u>The Cumulus Stage</u>
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 4.8.1A 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 Nelson 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 4.8.1 Heat Index

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	118	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	126	130					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Streuous Activity

Caution Extreme Caution Danger Extreme Danger

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 Sacramento can issue the following heat-related advisory as conditions warrant.

- **Excessive Heat Outlook**: are issued when the potential exists for an excessive heat event in the next 3-7 days. An Outlook provides information to Heat Index forecast map for the contiguous United States 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.

In Nelson County, this would include the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna.

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 Nelson. 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, 29 tornado events have been recorded in Nelson County. The strongest tornado reported in the county was an EF4 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
Dahlen Township	6/17/07	EF0
Wamduska Township	8/10/07	EF1
Stump Lake Park	8/10/07	EF1
Tolna	8/10/07	EF1
Whitman Township	08/13/2007	EF0
Aneta	08/26/2007	EF3
Michigan City	06/26/2009	EF0
Dahlen Township	06/17/2010	EF0
Tolna	07/21/2014	EF0

Source: National Climatic Data Center, 2014 http://www.ncdc.noaa.gov/stormevents/

The Northwood Tornado is neighboring Grand Forks County is worth mentioning as the close vicinity to Nelson County and the great impact it had across the State of North Dakota in recent history of severe summer weather. This tornado occurred on August 26, 2007. The tornado touched down about 2 miles west-southwest of Northwood. The tornado crossed the Goose River about one mile west-southwest of the Northwood airport and left a 200 yard wide stretch of downed trees in its wake. By the time it hit the airport, the ground track was one-third of a mile wide and growing wider. At this point, the tornado was still visible outside the increasingly heavy rain. The tornado reached an incredible width of eight-tenths of a mile as it pushed through Northwood to the east-northeast. The tornado had multiple vortices embedded in the overall wedge shaped tornado. The tornado was categorized as an EF-4 tornado. The strongest of these vortices appears to have scoured the ground and left broad circulation patterns of debris in the overall damage and debris field. Around this time, the tornado likely became wrapped in heavy rain and would have been difficult to observe from a distance. (National Climatic Data Center, 2013)

Widespread EF-3 and EF-4 damage occurred to main residential and business areas of Northwood. The most extreme damage occurred in the northeast corner of Northwood where Agvise Laboratories and Gabriel Construction buildings were total losses. In Northwood, an estimated 90 percent of the 362 single-family homes, 80 percent of the 110 multi-family homes, 100 percent of the 20 mobile homes, and 89 percent of the 37 municipal buildings were damaged. One death occurred in a mobile home, with 18 other injuries reported. The death occurred in a trailer park on the north edge of town, where 19 total units were demolished. Just to the east of the trailer park, in the area that sustained extreme damage, three businesses were hit particularly hard. An agricultural company, the city's largest employer, had its buildings heavily damaged. A nearby construction company lost two large steel buildings and other equipment. Steel beams from the two steel buildings were twisted and tossed nearby. Finally, a car dealership lost 15 to 20 vehicles from its parking lot along Highway 15. Many of these vehicles were damaged beyond recognition and tossed into nearby fields. Cars and trucks were carried up to one-half mile into corn and bean fields. One corn field to the north of Highway 15 (across from the 3 businesses on the northeast side of town) had its stalks snapped off several inches from the root bases, with pieces of husked corn lying around. Hangers and airplanes were also damaged at the airport. The local health center, school, supermarket, and grain elevator were damaged. Near the elevator, several rail cars were knocked off the tracks. Hundreds of trees were snapped, uprooted, or damaged. A total of about 2,600 truckloads of debris were hauled to the city landfill. (National Climatic Data Center, 2008)

The entire power distribution system was impacted. Basic power was restored within six days to all locations that could structurally accept services. Repairs to the system continued in 2008 to include services that were damaged, street lighting, pole straightening, and re-sag lines. Some municipal water mains were broken due to uprooted trees and other debris-generated damage, but there was no major loss of service. Wastewater services were not interrupted as a generator was used until regular power was restored. Telephone and cable services were lost citywide. In the days following the tornado, a Presidential Disaster Declaration (DR-1726-ND) was granted.

<u>Hail</u>

Since 1950, 84 days have been reported with severe hail reports (3/4 inches or greater) in Nelson 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
Petersburg	07/22/2007	0.88 in.
Aneta	07/22/2007	1.25 in.
Aneta	07/22/2007	1.75 in.
Petersburg	08/13/2007	2.00 in.
Petersburg	08/13/2007	1.00 in.
Tolna	08/26/2007	0.75 in.
McVille	08/26/2007	1.00 in.
Petersburg	08/26/2007	1.00 in.
Mapes	07/28/2008	1.00 in.
Aneta	07/28/2008	0.88 in.
Aneta	07/28/2008	0.88 in.
Lakota	09/22/2008	0.75 in.
Whitman	06/26/2009	1.50 in.
Michigan City	06/26/2009	1.00 in.
Lakota	08/12/2011	1.00 in.
Lakota	05/01/2012	1.00 in.
Michigan City	06/07/2012	0.75 in.
Michigan City	06/20/2012	0.75 in.
Pelto	07/21/2013	1.75 in.
Kloten	07/21/2014	2.00 in.

Source: National Climatic Data Center, 2013

Extreme Heat History

NCDC recorded 1 extreme heat events in Nelson County between 1950 and 2014. This event did not result in any human fatalities or injuries. The date recorded is August 4, 2001. This is not the highest temperature date as there is a tie of the highest temperature of 102F set on August 4th 1947 and tied on September 6th 1978.

Severe Thunderstorm Winds / Downbursts

Since 1955, 199 severe thunderstorm wind reports (58 mph or greater) have been recorded in Nelson County. Table 4.8.3C lists the reports of severe thunderstorm winds causing damages (besides tree damage).

Table 4.8.3C Severe Thunderstorm Wind Reports Causing Damage

Location	Date	Wind Speed	Damage Reported
Tolna	08/10/2007	55 kts. EG	Several large tree limbs were broken off trees in Tolna and in shelterbelts north of town. Shingles were ripped off a barn and tin was blown off a farm shed.
Tolna	08/10/2007	65 kts. EG	Numerous trees were uprooted at Stump Lake Park. One tree limb fell through the roof of the kitchen/cafe at Stump Lake Park. Other trees fell on recreational vehicles in the park.
Michigan City	08/10/2007	65 kts. EG	A swather was overturned in a field.
Petersburg	08/10/2007	55 kts. EG	Large branches were torn down and several houses lost shingles between the communities of Niagara and Petersburg.
Mcville	06/14/2008	55 kts. EG	One to one and a half foot diameter trees were knocked down by the wind onto a fence. Other one inch diameter branches were knocked down to the ground as well.
Dahlen	06/03/2011	50 kts. EG	Numerous large branches were broken off trees across several shelterbelts in Dahlen Township.
Lakota	08/01/2011	60 kts. EG	A flag pole and tree branches were blown down. The thunderstorms also dropped 1.50 inches of rain.
Michigan City	06/07/2012	50 kts. EG	Several large tree branches were broken down in a shelterbelt.
Petersburg	08/03/2012	50 kts. EG	Strong winds flattened corn crops.
Michigan City	06/25/2013	56 kts. EG	Trees were blown down.
Lakota	08/29/2013	55 kts. EG	Several four to eight inch diameter tree branches were broken down around Lakota.
Michigan City	08/29/2013	55 kts. EG	Several four to eight inch diameter tree branches were blown down in Michigan.
Mcville	07/21/2014	60 kts. EG	Multiple trees were blown down and two empty grain bins were blown over.
Aneta	07/21/2014	60 kts. EG	Portions of tin roofing were blown off of a county building
Michigan City	07/21/2014	50 kts. EG	Southern Nelson County was in a tornado warning. Tolna, Aneta, McVille, Pekin, all

			had power outages lasting from 3-5 hours due to downed trees and branches caused by high winds. High winds caused building damage in Aneta. McVille Fire Department reported a funnel cloud north of McVille. Rainfall amounts from 1-5" were reported.

Source: http://www.ncdc.noaa.gov/stormevents/

Lightning

Although lightning has the potential to cause damage to property and even fatalities, the National Climatic Data center does not have recorded events of damage cause by lightning for Nelson County since 2007 to 2014.

Non-Thunderstorm Strong Winds

Since 1950, there have been no non-thunderstorm wind events recorded in Nelson County that caused reported damage.

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 4.8.3F Nelson County Summer Storm Declared Disasters and Emergencies

Declaration	Location	Date	Other Information	Casualties	Damages
DR 1431	5 counties and 1 tribe in Eastern North Dakota	June 8 – August 11, 2002	Severe Storms and Tornadoes Public Assistance Also included impacts from flooding.	14 injuries^	$1,266,549*~ $283,797,000^ estimated total
DR 1515	19 counties and 2 tribes in Northern North Dakota	March 26 – June 14, 2004	Severe Storms Public Assistance Also included impacts from flooding and ground saturation.	None	$7,459,705*~
DR 1597	26 counties and 3 tribes	June 1 – July 7, 2005	Severe Storms Public	1 death^ 1 injury^	$20,350,276*~ $16,305,000^

	mostly in Northern and Eastern North Dakota		Assistance Also included impacts from flooding and ground saturation.		estimated total
DR 1645	11 counties and 1 tribe in Eastern North Dakota	March 30 – April 30, 2006	Severe Storms Public Assistance Also included impacts from flooding and ground saturation.	None^	$10,388,198*~
DR 1725	Cass and Steele Counties	July 15, 2007	Severe Storms and Tornadoes Public Assistance	Unknown	$935,462* $270,000,000 estimated total
DR 1829	48 counties and 4 tribes in Central and Eastern North Dakota	March 13 – August 10, 2009	Severe Storms Public Assistance and Individual Assistance Also included impacts from flooding.	Unknown	$184,696,371*~
State EO 2010-08	North Dakota	4/2/2010	State declared spring storm emergency	Unknown	Unknown

[1] Figures are statewide
^ Summer Storm portion
~ includes Flood and Summer Storm
* 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).
Source: North Dakota Department of Emergency Services, 2013.

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

Generally, the summer months are when the probability of severe thunderstorms in Nelson 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	Nelson County
Reported Tornadoes	28 events (1950-2013) Highest Magnitude: EF3 7 damaging events since 2007
Reported Severe Hail	39 events (2000-2013) Highest Magnitude: 3.0” 20 damaging events since 2007
Reported Extreme Heat Events	1 event (1950-2013) Heat Index: 130
Reported Severe Thunderstorm Winds	45 events (2000-2013) Highest Magnitude: 81 mph 15 damaging events since 2007
Reported Damaging Lightning Strikes	0 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 Nelson County:

- In an average year, 1-2 tornadoes.
- In an average year, 2-4 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 Nelson 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 Nelson County, the greatest determining factor is if the storm hits a populated area or not. Using the Northwood tornado from neighboring Grand Forks County as the benchmark, 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 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)
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 Grand Forks warns for tornadoes, severe thunderstorms, and high winds events for Nelson 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. Nelson 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 Nelson 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 Nelson County Tax Equalization Director

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

Location	Count
Urban Residential Structures	39
Rural Residential Structures	15

Source: Nelson County Tax Equalization Director

Figure 4.8.5G Vulnerable Populations

Facility Name	Population
Nelson County Health System Hospital (McVille)	19 Bed
Nelson County Health System Care Center (Nursing Home) (McVille)	39 Bed
Summerfield Assisted Living Facility (McVille)	19 Apartments
Good Samaritan Nursing Home (Lakota)	49 Beds
Prairie Rose Assisted Living Center (Lakota)	16 Apartments
Aneta Park View Health Center (Nursing Home)	39 Beds
Lakota Elementary School	92 Students
Lakota High School	100 Students
Dakota Prairie High School (McVille)	132 Students
Dakota Prairie Elementary School (Petersburg)	138 Students

Source: Nelson County Emergency Manager

The Nelson County cities of Aneta, Lakota, McVille, Michigan Pekin, Petersburg and Tolna 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 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.

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 access 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 4.8.5E 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 4.8.5F summarizes the vulnerability ranking for each hazard to determine the overall summer storm vulnerability ranking for Nelson County. The numbers provide low-moderate rating across for Nelson 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 Nelson 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 Nelson County included an estimated $33,969,000 in property damage since 1950. Crop loss figures were based on crop insurance policies paid totaled 60,103 payments totaling $128,510,352 from the years 1995 through 2012.
http://farm.ewg.org/cropinsurance.php?fips=38063&summpage=IN_BY_YEAR&statename=NelsonCounty,NorthDakota
Loss estimates are broken out by individual hazard in Table 4.8.5G.

Table 4.8.5J Severe Summer Storm Loss Estimates by Hazard

Event Type	Nelson County
Reported Tornadoes	$ 602,000 property damage
Reported Severe Hail	$10,000,000 property damage
Reported Extreme Heat Events	$0 property damage
Reported Severe Thunderstorm Winds	$30,000 property damage
Damaging Lightning Strikes	$0 property damage
Reported Strong Non-Thunderstorm Winds	$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. Building types that many state-owned buildings and critical facilities fall under are 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 Electrical Providers

	Nodak Electric Cooperative	**Western Area Power**	**Ottertail Power Company**
Aneta			X
Lakota	X	X	
McVille			X
Michigan	X		X
Pekin			X
Petersburg			X
Tolna			X
Rural Nelson County	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 reduce the risk necessarily. New development constructed to current building code standards may have a reduced risk of structural damages during a tornado or high wind event. Jurisdictions enforcing building codes include Aneta, McVille, Michigan, Pekin, Petersburg, and Lakota. The remaining jurisdiction, Tolna, could have new development that is not built to current standards for wind resistance. Generally, newer structures are built to withstand strong winds; mobile homes, however, continue to be the exception.

4.8.6 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	Highly Likely	
Impact	Critical	
Risk Class	A	
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 Nelson County. Major roadways in the county include US Highways 2 and State Highways 1, 35, 15, and 32. Multi-vehicular accidents are many times related to weather, either obscuring the vision of drivers or hindering their control of a vehicle. Fortunately, the North Dakota Department of Transportation 2013 study has indicated only two county structures to be structural obsolete and two structures to be functionally obsolete. Similarly, the State has only one state bridge with significant scour testing indicating the transportation is being maintained within the county.

The railroads in Nelson County include Amtrak for passenger service and Burlington Northern Santa Fe (BNSF) Railway and the Northern Plains Railroad for the transportation of goods. The Amtrak service runs through Nelson County from Devils Lake and Fargo along the Empire Builder route. Main BNSF main lines pass through Nelson County.

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 Nelson 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 Nelson County. The added capacity will help improve service to all customers and for Amtrak which operates on BNSF tracks in North Dakota.

The worst rail disaster in North Dakota history happened at 7:20 p.m. on August 9th in 1945 at Michigan in Nelson County. The first section of a Great Northern passenger train had to make an emergency stop, and the engine of section-two plowed into it from behind. The two Empire Builders were traveling to the West Coast as a pair. The first section contained the Pullman sleeper cars, with 237 aboard, and the second section carried between 600 and 700 in coach cars. A new crew came on at Fargo that afternoon, with section-one leaving at 3:25 and section two pulling out about 10 minutes later. Passengers were almost all military men and women – World War II was winding down and would, in fact, officially end within the week. (Source: www.michigannd.com)

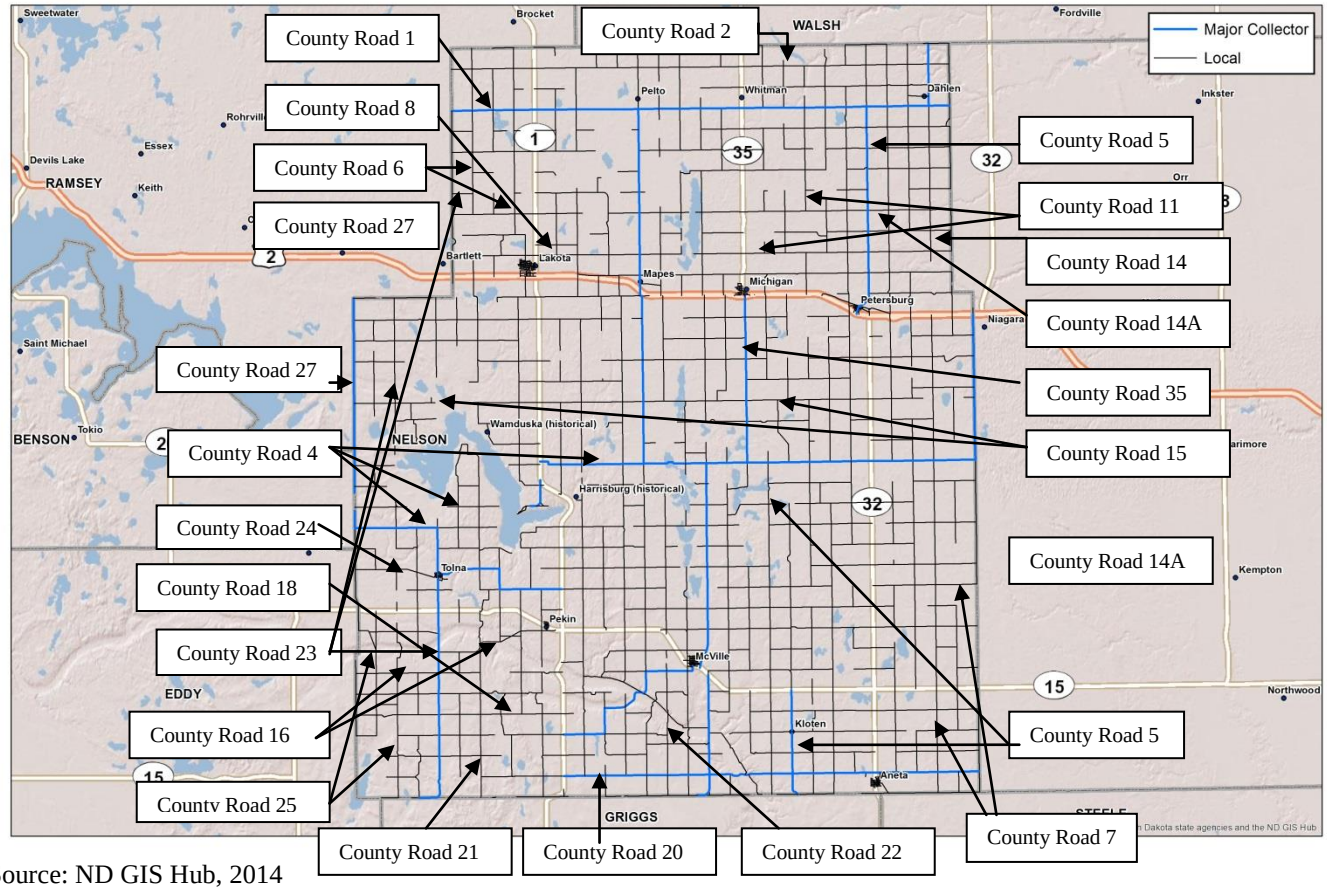
Lakota and McVille both have general aviation airports in Nelson County. Aviation accidents can occur for a multitude of reasons from mechanical failure to poor weather conditions to intentional causes. The size of accidents also varies widely from single engine incidents to large commercial crashes. 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. Three private airstrips are also located in Nelson County.

4.9.2 Geographic Location

Figure 4.9.2A shows the major transportation routes within the county. Generally, those areas are at greater risk for a transportation accident, however, a mass casualty transportation accident cannot be ruled out anywhere in the county. Some risk exists countywide.

Figure 4.9.2 below shows the Nelson County transportation routes. The County highways are identified, the township roads which are feeder roads to the county system are shown also but not identified. Many of the township roads are minimum maintenance roads, used only for farmer field access.

Figure 4.9.2A Nelson County Transportation Routes

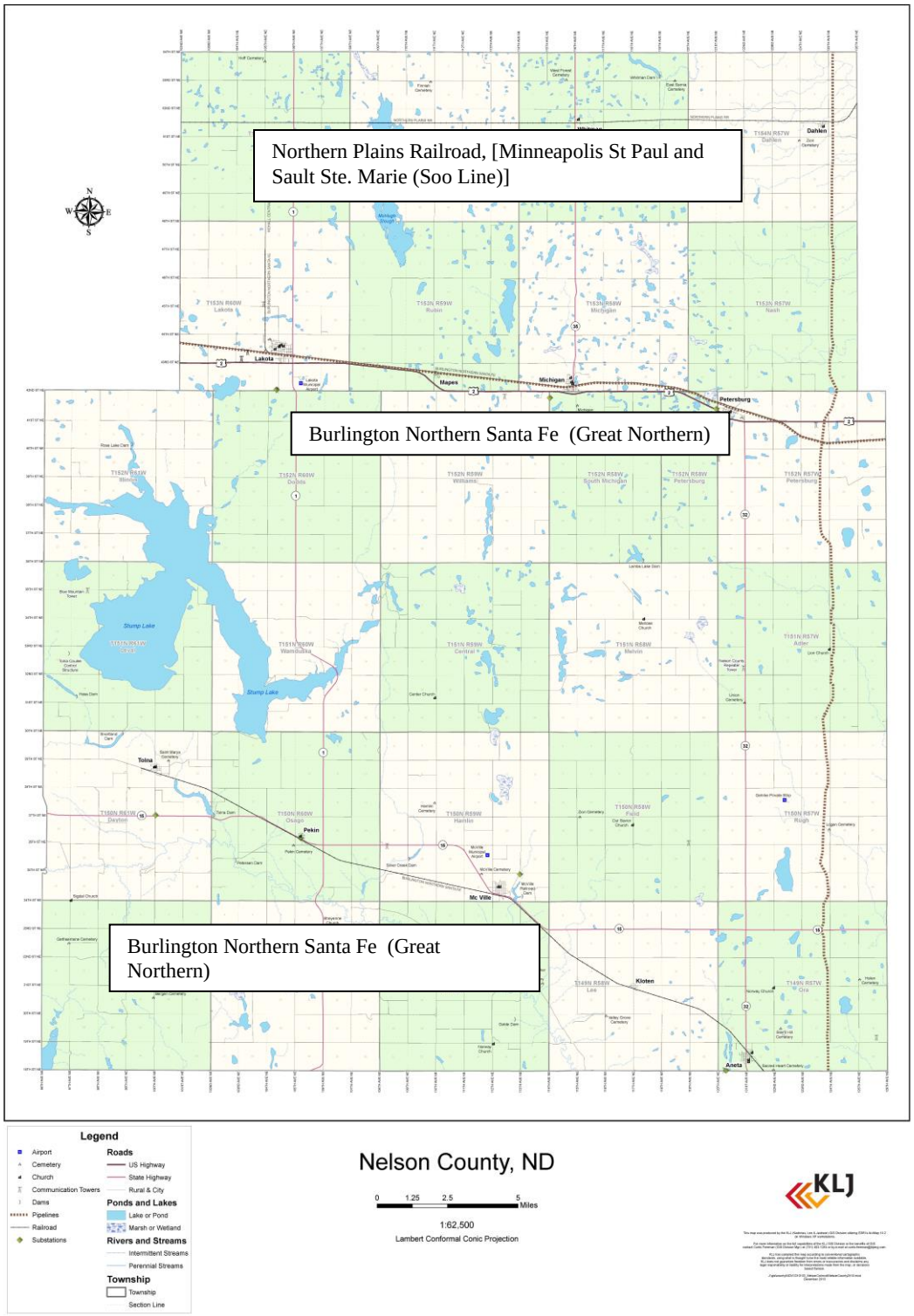


Source: ND GIS Hub, 2014

Nelson County Railroads

Nelson County has quite a railroad history. The Burlington Northern Santa Fe line that enters the county east of Petersburg and leaves the county west of Lakota is the original Great Northern Transcontinental Railroad. This railroad is important to the county in that it is a major commodity hauler for county agriculture interests. In recent years with the development of the Bakken Oil Fields in northwestern North Dakota it has become a major railroad line for the transportation of crude oil that is being shipped to refineries in the eastern United States. The Burlington Northern Santa Fe line that runs diagonally across the county from Aneta to Pekin was also a Great Northern line. It originally ran west of Pekin into Ramsey County. The line west of Pekin was abandoned and currently the railroad runs to Pekin. The Northern Plains Railroad was originally a branch line of the Soo Line and recently became a regional railroad serving northern Nelson County and eastern North Dakota.

Figure 9.2B, Nelson County Railroads



4.9.3 Previous Occurrences

The history of transportation accidents in Nelson 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 Nelson County from 2008-2012. Table 4.9.3B shows the railroad accidents/incidents in the county since 1998.

Table 4.9.3A Motor Vehicle Fatalities

Year	Number of Fatalities
2009	0
2010	0
2011	1
2012	1
2013	2

Source: http://www.dot.nd.gov/divisions/safety/docs/crash-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, 2014.

The Grand Forks Airport has the distinction of being the location of the first attempted airplane hijack in the state in 1974. (State Historical Society of North Dakota, 2007) Table 4.9.3C has data on the fatal aircraft accidents in the county since 1963.

Table 4.9.3C Fatal Aircraft Accidents

Date	Location	Fatalities	Additional Information
None			

Source: National Transportation Safety Board, 2014.

Table 4.9.3D Nelson 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	*No regional history*				Large Aircraft in Urban Area	
	No local history			Interstate Bridge Collapse		
	100 years		Mass Casualty Accident			
	50 years	Fatal Car Accident				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		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, Nelson County has 1 traffic fatality annually.

The major railroad accident of 1945 has had a long lasting effect on the County. However, recent history has shown far less impact of rail and airline accidents on the community. 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.

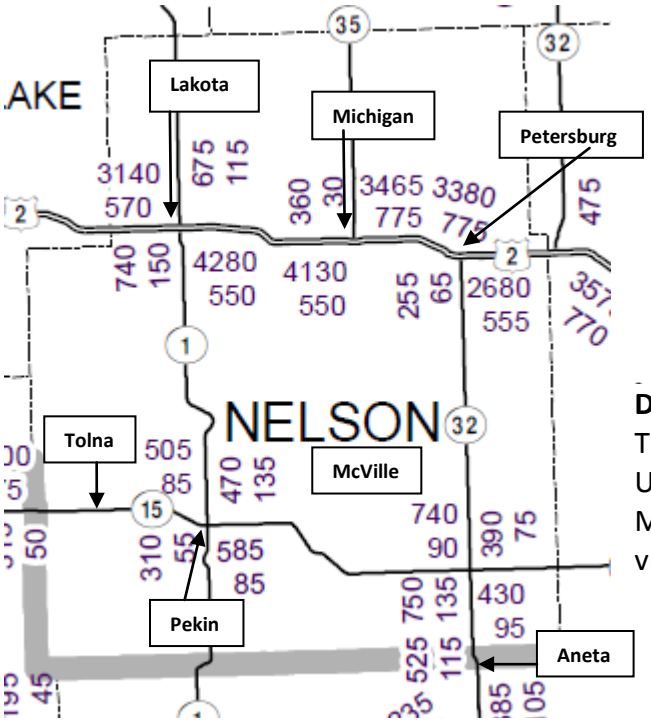
Any mass casualty incident that overwhelms the emergency response resources within the county and neighboring counties, such as a bus or plane crash, represents a high magnitude event.

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.

Nelson 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 #2. The BNSF Railroad is a major transportation route for Bakken Crude Oil moving to eastern markets and for agricultural products produced on the Great Plains to move to eastern and western markets.



Daily Traffic Count (Source: ND Department of Transportation)
The Daily Traffic Count map demonstrates the cities along US Highway 2 have a higher traffic count than Tolna, Pekin, McVille, and Aneta. 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 Nelson County for 2011. According to NDDOT Crash Summary for 2011, 55 percent of the crashes in the State occurred in urban locations and 77 percent of the fatal crashes occurred on rural roads.

Table 4.9.5A Nelson County NDDOT Motor Vehicle Crash Data and Associated Costs, 2011

Injuries	Fatalities	Crashes	Injury Costs	Fatal Costs	Costs
15	1	92	$854,370	$6,039,436	$6,893,706

Source: North Dakota Department of Transportation, 2011

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. These figures were converted from 2008 dollars to 2011 dollars using an annual inflation rate of 1.04 percent. A crash resulting in a non-incapacitating injury averages $56,958 per crash while a fatal crash averages $6,039,436. Using this data, Nelson County had estimated injury and fatality costs from motor vehicle crashes in 2011 of $6,893,706, one of the lower values in the state.

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
- TransAction II, North Dakota's Statewide Strategic Transportation Plan
- North Dakota Highway Safety Plan

4.10 Urban Fire or Structure Collapse

Frequency	Likely	
Impact	Critical	
Risk Class	B	
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	
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 2011, 83 firefighters died in duty-related incidents. 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 15.7 people per million compared to the national death rate of 12.3. (US Fire Administration, 2008)

Although structure fires are usually individual disasters and not community-wide ones, 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. Nelson 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 Nelson County each have a volunteer fire department, this includes Aneta, Lakota, McVille, Michigan, Pekin, Petersbuirg, and Tolna. The fire departments are equipped to handle basic structural and wildland fires 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 Grand Forks.

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
Aneta Fire Protection District	12	Volunteer
Lakota Fire Protection District	20	Volunteer
McVille Fire Protection District	12	Volunteer
Michigan City Fire Department	14	Volunteer
Michigan-Whitman Rural Protection District	14	Volunteer
Pekin Fire Protection District	15	Volunteer
Petersburg Fire Protection District	12	Volunteer
Tolna Rural Fire District	30	Volunteer

Source: Nelson County Fire Departments/Fire Protection Districts

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 Nelson County, but most do not reach "disastrous" levels. Significant events in the county's history include the Petersburg School burned in December, 1987; August 1990 Joe Lamb Oil and Supply in Michigan burned to the ground causing over $2,000,000 in damages; Burt's Repair in Lakota burned down in July 2009; Lakota had a large propane gas fire in August 1976 and the burning of the Nelson Fish Farm on June 1, 2005. The building and all the fish were destroyed. Structure collapse occurs with much less frequency.

Table 4.10.2A Nelson 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	*No regional history*			Large Occupied Building Collapse		
	No local history					
	100 years		Downtown Explosion & Fire			
	50 years	Fatal Fire				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		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.

Nelson County has a low urban fire or structure collapse hazard rating. The rating was determined based on the 2010 housing density, which is an indicator of urban areas. 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 Nelson County, the county does not have building codes and only two cities have 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 active fire departments in each community.

Table 4.10.1A lists the number of firefighters for each fire department in Nelson County. If one were to use the number of available fire fighters as the criteria for determining vulnerability, Tolna with 30 firefighters and Lakota with 20 firefighters would have the least vulnerability.

Loss Estimates

Urban fires caused 192 fire incidents in Nelson from 2004 to 2014, of which 38 were structure fires, resulting $1,717,972 in fire-related losses. This equates to an average loss of $45,209.00 per fire incident or $4,521 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 two non-fire related civilian deaths. (North Dakota State Fire Marshall, 2014) With different types of fire incidents and death and injury

occurrences, it is difficult to predict future fire loss estimates. Table 4.10.5A summarizes fire department incident type for all Nelson County fire departments from the period 2004 to 2014.

Table 4.10.5A Fire Department Response from 2004 to 2014

Incident Type	Frequency	Percent of total calls
Fires		
Structure Fires	38	10.47%
Vehicle Fires	40	11.02%
Other Fires	114	31.4%
Total Fires	192	52.89%
Pressure, Ruptures, Explosion, Overheat	0	0
Rescue Calls		
Emergency Medical Treatment	42	11.57%
Others	31	8.54%
Total Rescue Calls	73	20.11%
Hazardous Condition Calls	30	8.26%
Service Calls	11	3.03%
Good Intent Calls	21	5.79%
Severe Weather or Natural Disaster Calls	4	1.0%
Special Incident Calls	2	.55%
False Calls		
Malicious Calls	1	.28%
Other False Calls	29	7.99%
Total False Calls	30	8.26%
Total Calls	363	100%
Total Fire Dollar Loss	$1,717,972	
Total Dollar Loss	$1,835,472	

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.

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 Nelson County.

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	
Impact	Limited	
Risk Class	C	
Seasonal Pattern	April 15-October 31	
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.

Nelson County general wildfire season runs from April 1st through October 31st. 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 Nelson County.

Humans and human activity cause most of the wildland fires in Nelson 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, 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. Nelson County has a number of large US Fish and Wildlife Service and ND Game and Fish Department tracts. 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 2013, Nelson County had 81,632 acres participating in the CRP. (Farm Service Agency, 2014) Much of the CRP acreage is coming off of contract in 2014 and will be greatly reduced in future years reducing the wildfire risk. An additional roughly 100,000 acres of native grasslands and grassy areas 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 Nelson County have contiguous grasslands stretching nearly 40 miles in length with a 3-mile width in several places. Stump Lake has an established native forest along its banks consisting mainly of hardwoods including oak, ash, and elm.

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 Nelson 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 crop, its condition at that point in the growing season, and whether or not the land is irrigated. 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 Nelson County. Those structures located near government lands, CRP lands, or other non-irrigated vegetation are generally considered 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. Nelson County was determined to have a Low risk.

In Nelson, this would include the cities of Aneta, Lakota, McVille,Michigican, Pekin, Petersburg and Tolna.

4.11.3 Previous Occurrences

Wildland fires occur annually in Nelson 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. In this database, 6 wildfires are listed burning 177 acres in Nelson County. 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 Nelson County. There have been no emergency or disaster declarations for wildland fire in Nelson 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

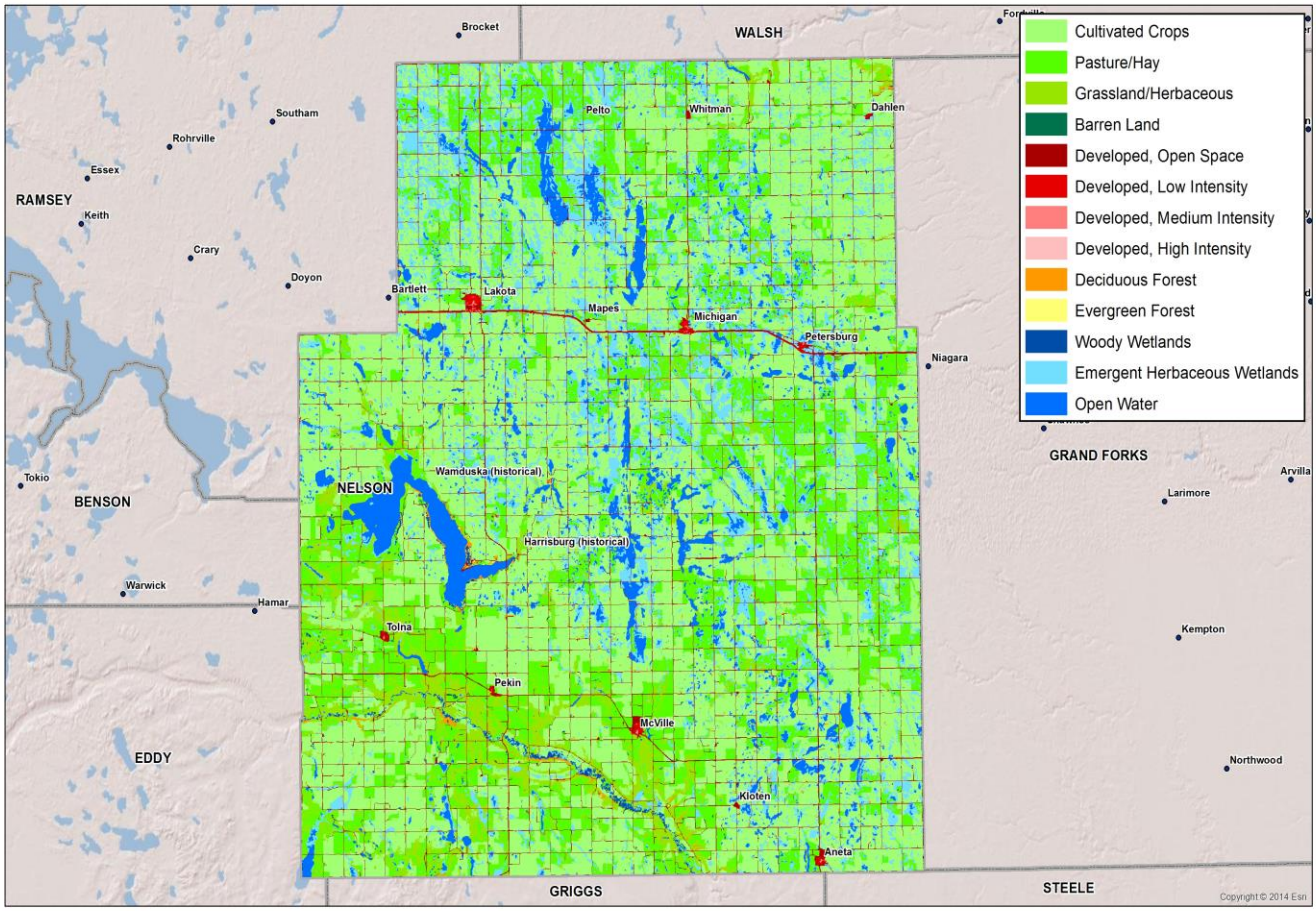
Frequency	*No regional history*				
	No local history			Wildfire Burning an Entire City	
	100 years		Wildfire Burning Many Residences		
	50 years	Wildfire Burning Farm Structures			
	Annually				
		Negligible	*Limited*	*Critical*	*Catastrophic*

		Impact

Wildland fires are usually an annual occurrence in Nelson 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 Nelson County.

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 Nelson 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 wildlife 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 Nelson County is considered Low. There are several reasons the wildland fire risk is low. The reasons are the Nelson 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
Aneta Fire Protection District	12	Volunteer
Lakota Fire Protection District	20	Volunteer
McVille Fire Protection District	12	Volunteer
Michigan City Fire Department	14	Volunteer

Michigan-Whitman Rural Protection District	14	Volunteer
Pekin Fire Protection District	15	Volunteer
Petersburg Fire Protection District	12	Volunteer
Tolna Rural Fire District	30	Volunteer

Source: Nelson County Fire Departments

To determine vulnerability based on the size of the fire department, Tolna with 30 firefighters and Lakota with 20 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. The SILVIS data 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
25	13	27	15	52	28

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 28 total housing units in High and Moderate Risk Categories in Nelson County, with a median housing value of $51,100, which equates to a total of $1,430,800 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 Nelson 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 Nelson County, especially along Stump Lake 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 Nelson County communities have requirements related to ingress and egress, building sites, densities, water supply, building materials, and fuels maintenance.

The projected population change in Nelson County from 2010-2025 is to remain basically the same and therefore determined to have 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 Community 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

4.12 Severe Winter Weather

Including Blizzards, Heavy Snow, Ice Storms, and Extreme Cold

Frequency	Likely	
Impact	Critical	
Risk Class	B	
Seasonal Pattern	Winter-November to March/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 Nelson County is no exception. Winds, snow, and cold temperatures blast the region every winter. On average, the coldest month is January with average high temperatures in the lower teens and average low temperatures around -5°F. January temperatures are the coldest in northeastern North Dakota than anywhere else in the state. An average January temperature in Nelson County is about 2°F versus an average January temperature of 14°F in the southwestern corner of the state in Bowman County. In Nelson 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. 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

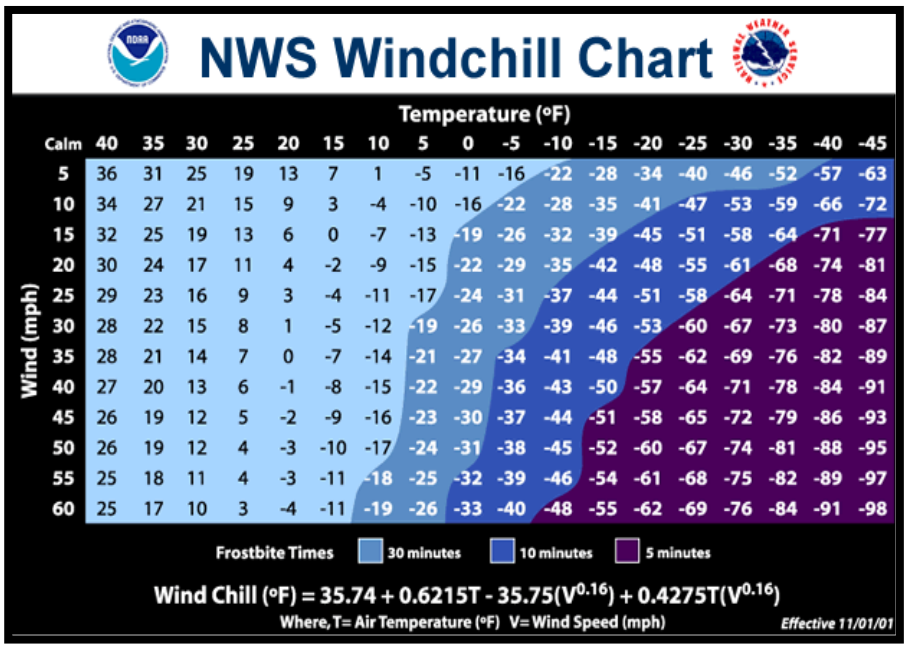
Ice storms develop when a layer of warm (above freezing), moist air aloft coincides with a shallow cold (below freezing) pool of air at the surface. As snow falls into the warm layer of air, it melts to rain, and then freezes on contact when hitting the frozen ground or cold objects at the surface, creating 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 Nelson 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 Nelson County is -44°F. 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 shows the current wind chill chart.

Figure 4.12.1A National Weather Service Wind Chill Chart



NWS Windchill Chart

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

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

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

Where, T= Air Temperature (°F) V= Wind Speed (mph) Effective 11/01/01

Source: National Weather Service, 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 Nelson 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 Nelson County, this would include the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna.

4.12.3 Previous Occurrences

Nelson 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

Date	Type	Impacts
3/15/07	Heavy Snow	A Colorado Low tracked from northeast Colorado on the morning of the 9th into west central Minnesota on the morning of the 10th. This system pushed unseasonably warm and moist air into the northern plains, with surface dew point temperatures on the 9th rising into the 30s. As rain fell on the colder ground, surfaces quickly became ice covered. Roughly 0.10 to 0.40 inches of ice was reported, making the morning commute on the 9th extremely treacherous. Hundreds of vehicle accidents were reported from the slick roads. Hospitals also reported many bumps and bruises from people slipping and falling. Many schools were closed on Monday (9th), and then began late on Tuesday. Most areas did not receive their regular mail delivery on Monday.
12/4/07	Heavy Snow	On the heels of the first early December heavy snow producer (across southeast North Dakota and portions of northwest and west central Minnesota), a second heavy snow event followed roughly two days later. Six to 9.5 inches of snow fell along a corridor from northern Towner County (ND) to southern Grand Forks County (ND) to central Wadena County (MN). When combined with the snow totals from the prior early December event, many locations ended up with 15 to 20 inches of snow. This was good news for many snow related business in the area, which had not had this much early December snow for a number of years. As far as meteorological details, an area of surface low pressure tracked from eastern Montana to near Sioux Falls, SD. A fairly strong vorticity maximum was evident on water vapor imagery along the heavy snow path. The system also had a coupled upper jet structure to aid in providing strong lift. Quite a few rural schools cancelled classes or events early on Tuesday (4th) or early on Wednesday (5th).
02/08/2008	Blizzard	Late in the evening of the 8th, a cold front was located along a line from the Turtle Mountains to just east of Bismarck (ND). By Saturday morning (9th), the front had moved into Minnesota, along a line from near Baudette to Detroit Lakes. Very little snow fell as the front moved through, as most locations reported an inch or less. However, north to northwest winds gusted from 45 to 55 mph behind the front, causing ground blizzard conditions in open country with wind chills from 25 below to 40 below zero. Snow plows were pulled in many areas, and some school events were cancelled. No travel was advised in much of eastern North Dakota
12/13/2008	Blizzard	Potent surface low pressure system moved out of Colorado late Saturday (13th) and tracked northeast to the Minneapolis area by noon on Sunday (14th). This created a strong temperature gradient across the northern plains, with Devils Lake (ND) at 15 below zero and the Minneapolis (MN) area around 30 above by noon Sunday. As the system intensified over eastern Minnesota, northwest winds began to gust to around 50 mph with wind chills colder than 40 below zero. Quite a bit of snow also accompanied the wind, which created whiteout conditions for an extended period of time. A blizzard this bad had not been seen since the winter of 1996/97, so the impact on the area was tremendous. Stores closed for portions of the weekend during the busy holiday shopping season. Interstate 29 was closed in the state of North Dakota and Interstate 94 was closed from Jamestown (ND) to Alexandria (MN). No travel was advised across the area and commercial flights were cancelled into Fargo and Grand Forks. Church services, schools, and many other activities were cancelled or delayed. The town of Buffalo, ND, lost power for around 8 hours. There were other minor power outages across the area as well.

2/8/2009	Ice Storm	A Colorado Low tracked from northeast Colorado on the morning of the 9th into west central Minnesota on the morning of the 10th. This system pushed unseasonably warm and moist air into the northern plains, with surface dew point temperatures on the 9th rising into the 30s. As rain fell on the colder ground, surfaces quickly became ice covered. Roughly 0.10 to 0.40 inches of ice was reported, making the morning commute on the 9th extremely treacherous. Hundreds of vehicle accidents were reported from the slick roads. Hospitals also reported many bumps and bruises from people slipping and falling. Many schools were closed on Monday (9th), and then began late on Tuesday. Most areas did not receive their regular mail delivery on Monday.
12/24/2009	Blizzard	As the area of low pressure stagnated over Iowa, it deepened and brought stronger north to northeast winds to eastern North Dakota. The combination of snow and strong winds brought whiteout conditions to eastern North Dakota. One rarity of the blizzard was the relatively warm temperatures (20s) that held throughout the event. Conditions finally improved on the morning of the 26th, but it took a long time to dig out from all the snow. Interstates 29 and 94 were both closed for an extended period of time, with travel and all other activities essentially shut down. Many of the larger cities spent thousands of dollars on employee salaries, fuel, and maintenance costs for plowing snow. The 25.5 inch storm total snowfall measured at the Grand Forks National Weather Service office was one of its highest storm total amounts ever.
12/25/09	Heavy Snow	A strong winter storm event struck eastern North Dakota during the Christmas holiday, dropping heavy amounts of snow over an extended period of time. One to two feet of snow fell over eastern North Dakota, with the most snow falling over the central Red River Valley. The system was well forecast, which gave people ample time to adjust their Christmas plans. The actual track of the surface low was a bit of hybrid, tracking from Arkansas northward into Iowa, where it stayed nearly stationary for over a day
12/15/10	Heavy Snow	A persistent surface boundary set up across the western Dakotas, with a tight thermal gradient from west to east. Bands of heavy snow made it as far east as a Cando to Cooperstown to Wyndmere line. The heaviest snow, 12 to 14 inches, fell in the Devils Lake basin, while slight lower amounts, 8 to 11 inches, fell over portions of southeast North Dakota.
12/20/10	Heavy Snow	An area of surface low pressure formed over south central North Dakota on the evening of the 20th and tracked into central Minnesota by mid morning of the 21st. This helped spread a swath of 6 to 8 inches of snow from Devils Lake to Reynolds (North Dakota) to Mahnomen (Minnesota). Lesser amounts of snow fell to the north and south of this line, but some areas did pick up a little light freezing drizzle.
01/25/2010	Blizzard	As the area of surface low pressure over western Lake Superior started to move east, it began to pull colder air from southern Canada down across the northern plains on very strong northwest winds. Temperatures in the teens to around 20F in the early morning dropped to the single digits above zero by late in the day. Light snow also accompanied the push of colder air. As wind speeds increased during the early morning hours of the 25th, whiteout conditions quickly developed over eastern North Dakota. Wind speeds gusted up to 55 mph and helped produce some large snow drifts, hampering travel. Luckily, the warm temperatures and freezing precipitation which had occurred on the 22nd and 23rd helped to freeze up the snowpack. Therefore there was a limited amount of snow to blow around.
10/26/2010	Blizzard	As snow moved into the Devils Lake region, the combination of light snow and strong wind speeds created ground blizzard conditions. The most snow, six inches, fell between Esmond and New Rockford, just to the west and southwest of Devils Lake. This was also a robust rainfall producing system and before the precipitation changed to snow, much of the area picked up one to two inches of rain. As the precipitation type changed from rain to snow, some areas also temporarily picked up some sleet. Roads west of Devils Lake became quite slick.

03/11/2011	Blizzard	This late winter blizzard was much like some of the killer blizzards of the past. Most of Friday the 11th was beautiful for mid March, with steady south winds and temperatures in the upper 30s to middle 40s. After beginning the month with highs in the teens and low 20s, the warmth of the day lulled many people into not believing that a blizzard was coming. By late in the afternoon into the evening, winds abruptly switched to the north-northwest and gusted from 50 to 60 mph. Combined with light falling snow, visibilities quickly dropped below a quarter mile in whiteout conditions. Despite the warnings that had been issued earlier, many people were caught off guard. Interstate 94 was closed from Fargo to Dickinson, Interstate 29 was closed from the Canadian border to the South Dakota border, and U. S. Highway 2 was closed from Grand Forks to Devils Lake.
01/11/2013	Blizzard	Surface low pressure tracked from the central plains on the morning of the 11th to the Minnesota arrowhead by the morning of the 12th. This system brought 3 to 8 inches of snow to the region. As north to northwest wind speeds gusted from 35 mph to 50 mph later on the 11th through the morning of the 12th, whiteout conditions occurred.
01/19/2013	Blizzard	As a surface low pressure system moved into northern Minnesota on the 19th, a cold front surged southward with northwest winds of 35 mph to 50 mph behind it. These strong winds picked up loose snow and dirt which resulted in ground blizzard conditions in open country.
02/18/2013	Blizzard	Winds gusting from 40 to 60 mph produced widespread blizzard conditions through Monday morning. New snow accumulations ranged from 2 to 5 inches, and combined with existing loose snow pack to produce whiteout conditions at times. Most major highway systems in eastern North Dakota and the Red River Valley were closed through the forenoon and early afternoon hours.
3/3/13	Heavy Snow	An area of surface low pressure drifted to near Bismarck, North Dakota, by the early morning hours of the 4th and stalled there until the early morning hours of the 5th. This resulted in a prolonged period of snow over most of eastern North Dakota and the northwest quarter of Minnesota. Several stations in northeast North Dakota reported snow amounts of over a foot, with the Sarles (ND) station reporting 18 inches
03/17/2013	Blizzard	The heavy snow which had accumulated through the day on Sunday became affected by the steadily increasing winds and dropping temperatures overnight Sunday night. By Monday morning, blizzard conditions had developed across much of eastern North Dakota into the Red River Valley.
12/28/2013	Blizzard	Widespread ground blizzard conditions occurred as cold air surged into the Northern Plains on gusty north winds. Some locations started the day with temperatures in the low 30s, but by late afternoon temperatures had dipped into the single digits above and below zero. Conditions were especially bad in open country where many locations issued no travel advisories.
01/03/2014	Blizzard	Freezing rain and sleet fell across the area on the afternoon of the 3rd, helping to put a little crust on the old snowpack. As the winds increased during the late afternoon and evening, several light snow bands also moved through. As these snow bands moved through, visibilities dropped to near zero at times in open country. Conditions generally improved when the snow ended, indicating the crust on the old snow mainly held, not allowing the old snow to blow around too. Several major roads were closed, including Interstate 29 between Grand Forks and Fargo.
01/16/2014	Blizzard	A cold front swept through the area during the early morning of the 16th, as surface low pressure tracked across southern Canada into the Minnesota arrowhead. Behind the cold front, temperatures dropped quickly and northwest winds increased. Many locations across the area saw wind gusts in the 45 to 60 mph range. Quite a few schools and events were also closed during the storm. Conditions were the worst in open country when snow was falling.

01/22/2014	Blizzard	Another cold front swept through the region with strong north-northwest winds in its wake. Winds generally gusted from 35 to 45 mph with the worst conditions again in open country outside of sheltered areas. Numerous schools closed for the day.
01/26/2014	Blizzard	North to northwest winds gusting to 45 to 55 mph combined with several inches of fresh powdery snow on the ground to produce whiteout conditions in open country. Conditions also deteriorated in some sections of the larger cities, which had not happened with the other blizzard events of the winter to date. Some schools were delayed or cancelled on the 27th, as roads were just starting to be plowed. A Winnipeg man was struck and killed on Interstate 29 near Pembina when he stopped to check an accident scene.
03/31/2014	Blizzard	An area of surface low pressure intensified as it moved into southeast South Dakota on the morning of the 31st. This resulted in gusty north to northeast winds of 40 to 50 mph and heavy amounts of snow in some areas. The most snow, twelve to twenty inches, fell from Grafton to Valley City. These amounts lowered to about three to five inches to the northwest of Devils Lake and across southeast North Dakota. The snow and wind combined to produce whiteout conditions over most of eastern North Dakota into portions of the northwest quarter of Minnesota. Interstate 29 was closed in eastern North Dakota, Interstate 94 was closed from Bismarck to Fargo, and U. S. Highway 2 was closed from Devils Lake to Grand Forks. This event continued into April 1, 2014.
04/01/2014	Blizzard	An area of surface low pressure intensified as it moved into southeast South Dakota on the morning of the 31st. This resulted in gusty north to northeast winds of 40 to 50 mph and heavy amounts of snow in some areas. The most snow, twelve to twenty inches, fell from Grafton to Valley City. These amounts lowered to about three to five inches to the northwest of Devils Lake and across southeast North Dakota. The snow and wind combined to produce whiteout conditions over most of eastern North Dakota into portions of the northwest quarter of Minnesota. Interstate 29 was closed in eastern North Dakota, Interstate 94 was closed from Bismarck to Fargo, and U. S. Highway 2 was closed from Devils Lake to Grand Forks. This event began on March 31, 2014.

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/stormevents/

Table 4.12.3A Significant Winter Weather Events – Severe Cold/Wind Chill, Winter Storm

Date	Type		Date	Type
01/12/2007	Severe Cold/Wind Chill		02/28/2007	Winter Storm
02/03/2007	Severe Cold/Wind Chill		03/01/2007	Winter Storm
01/17/2008	Severe Cold/Wind Chill		02/13/2008	Winter Storm
01/29/2008	Severe Cold/Wind Chill		11/06/2008	Winter Storm
02/09/2008	Severe Cold/Wind Chill		12/19/2008	Winter Storm
02/19/2008	Severe Cold/Wind Chill		03/24/2009	Winter Storm
12/15/2008	Severe Cold/Wind Chill		01/22/2010	Winter Storm
12/20/2008	Severe Cold/Wind Chill		03/22/2011	Winter Storm
01/03/2009	Severe Cold/Wind Chill		04/15/2011	Winter Storm
12/15/2009	Severe Cold/Wind Chill		02/25/2012	Winter Storm
01/07/2010	Severe Cold/Wind Chill		11/10/2012	Winter Storm
02/01/2011	Severe Cold/Wind Chill		03/17/2013	Winter Storm
02/08/2011	Severe Cold/Wind Chill		04/14/2013	Winter Storm
01/18/2012	Severe Cold/Wind Chill		12/03/2013	Winter Storm
02/10/2012	Severe Cold/Wind Chill			
01/20/2013	Severe Cold/Wind Chill			
01/31/2013	Severe Cold/Wind Chill			
02/01/2013	Severe Cold/Wind Chill			
12/06/2013	Severe Cold/Wind Chill			

12/28/2013	Severe Cold/Wind Chill		
01/04/2014	Severe Cold/Wind Chill		
01/22/2014	Severe Cold/Wind Chill		
01/26/2014	Severe Cold/Wind Chill		
02/28/2014	Severe Cold/Wind Chill		
03/01/2014	Severe Cold/Wind Chill		

Source: National Climatic Data Center, http://www.ncdc.noaa.gov/stormevents/

Table 4.12.3B Nelson County Winter Weather Declared Disasters and Emergencies

Declaration	Location	Date	Other Information	Casualties[1]	Damages[1]
DR 1157	Nelson 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	Nelson 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, 2014.

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 is discussed in additional detail at the beginning of this Risk Assessment Chapter.

Table 4.12.4A Hazard Frequency and Impact Ranges

<table>
<tr><td rowspan="8">Frequency</td><td>No regional history</td><td></td><td></td><td></td><td rowspan="3">Extreme Isolation and Power Outages Statewide</td><td rowspan="8"></td></tr>
<tr><td>No local history</td><td></td><td></td><td></td></tr>
<tr><td>100 years</td><td></td><td></td><td rowspan="2">Long Duration Blizzard</td></tr>
<tr><td>50 years</td><td rowspan="2">Heavy Snow</td><td rowspan="2">Winter Road Closures/Outage</td><td></td></tr>
<tr><td>Annually</td><td></td><td></td></tr>
<tr><td></td><td>Negligible</td><td>Limited</td><td>Critical</td><td>Catastrophic</td></tr>
<tr><td></td><td colspan="5">Impact</td></tr>
</table>

From January 2007-July 2014, 17 blizzards, 23 extreme cold events, 6 heavy snow events (closing schools and/or roads and not included in another type), 1 ice storm, and 14 winter storms (involving a damaging

combination of wind, snow, and/or ice and not included in another type). Table 4.12.3B shows the associated probabilities based on this historical record.

Table 4.12.4B Winter Weather Recurrence Intervals

Winter Weather Type	Recurrence Interval (estimated)
Blizzard	2-3 events/year
Extreme Cold	2-3 events/year
Heavy Snow (closing schools and/or roads and not included in another type)	1 event/year
Ice Storm	0-1 event/year
Winter Storm (involving a damaging combination of wind, snow, and/or ice and not included in another type)	1-2 events/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 Nelson 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 Nelson 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 Nelson 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 Homes

Heating Fuel	Percent of homes	Number of Homes
Natural Gas	2.4%	36
Propane	19.2%	287
Electricity	52.1%	778
Fuel Oil	23.6%	352
Coal	0.2%	3
Others	0.4%	6
None	2.1%	31

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 Nelson County cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna 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 winter storm power outage occur. Most farmers 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 Nelson 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 4.12.5A summarizes the calculated ranges applied to determine the overall vulnerability ranking based on the scores which ranged from 10 through 39.

Table 4.12.5A 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 Nelson 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 4.12.5B shows the vulnerability ranking for Nelson County derived from the analysis of data from these sources. The overall vulnerability score is low-moderate for Nelson county, based on the rankings above.

Table 4.12.5B Nelson 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	$2,000	$154	$486,024	3.2	$8,036,000	$77,333,000	$1,093	$1,228	$123	20

The materials used for home construction play a factor in severe winter storm/winter weather conditions home vulnerability. The building materials are shown in Table 4.12/5C.

Table 4.12.5C Structural Build of Nelson 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 conservation with the Nelson County Tax Equalization Director

Manufactured homes are generally more susceptible to severe winter weather conditions due to freezing of water pipes if the home is not skirted properly and heating fuel use in extreme cold conditions. The number of manufactured homes is shown in Table 4.12.5D.

Table 4.12.5D Estimated Manufactured Homes (not affixed to the ground) Count in Nelson County

Location	Count
Urban Residential Structures	39
Rural Residential Structures	15

Source: Nelson County Tax Equalization Director

The elderly and young are vulnerable to severe weather conditions. The location and size of the vulnerable population facilities are shown in Table 4.12.5E.

Figure 4.12/5E Vulnerable Populations

Facility Name	Population
Nelson County Health System Hospital (McVille)	19 Bed
Nelson County Health System Care Center (Nursing Home) (McVille)	39 Bed
Summerfield Assisted Living Facility (McVille)	19 Apartments
Good Samaritan Nursing Home (Lakota)	49 Beds
Prairie Rose Assisted Living Center (Lakota)	16 Apartments
Aneta Park View Health Center (Nursing Home)	39 Beds
Lakota Elementary School	92 Students
Lakota High School	100 Students
Dakota Prairie High School (McVille)	132 Students
Dakota Prairie Elementary School (Petersburg)	138 Students

Source: Nelson County Emergency Manager

To compare the vulnerability of the Nelson County cities, McVille is the most vulnerable because it has the County Hospital which increases the vulnerability. The other cities are equal in vulnerability.

Loss Estimates

Based on NCDC 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 Nelson County included $2,000 in property damages, with no direct deaths or injuries reported. Based on these numbers, Nelson County could expect roughly $154.00 in average annual property damages from severe winter storms.

As mentioned previously, total crop insurance payments for insurable crops due to cold winter in Nelson County totaled $1,093 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 $1,228, or about $123 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

	NoDak Electric Cooperative	Western Area Power	Ottertail Power Company
Aneta			X
Lakota	X	X	
McVille			X
Michigan	X		X
Pekin			X
Petersburg			X
Tolna			X
Rural Nelson 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:

- North Dakota Emergency Operations Plan

4.13 Geologic Hazards

Including Landslide, Earthquake, and other Geologic/Mining Hazards

Frequency	Unlikely	
Impact	Limited	
Risk Class	D	
Seasonal Pattern	None	
Duration	Minutes to weeks	
Speed of Onset	Minimal warning	

4.13.1 Description

Geologic hazards in Nelson County usually do not cause severe damage, as other hazards may, but the potential exists for the occasional landslide, earthquake, or mine collapse 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 occur in natural and anthropogenic settings in Nelson County and are most commonly found within major river valleys and on engineered slopes along major transportation corridors.

Landslides are dominantly found in one of two settings, one of which is by the major river valleys such as along the Red River tributaries including the Sheyenne, Forest, and Goose Rivers and along Stump Lake (North Dakota Geological Survey).

Riverbank slumping can be considered a form of landslide and is often found along the rivers in Nelson County. The riverbank soils are inherently weak, and natural forces are always moving river channels. Urbanization has artificially accelerated 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 Nelson County yet there is a potential that some structure still 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).

Nelson 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 Nelson County, however, relatively small earthquakes may occur in areas not recognized for regular earthquake activity.

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 Nelson County (less than 1.5% of area).

In general, landslides in Nelson County occur along natural slopes along major river corridors. They may also occur on engineered slopes along major transportation routes. Slide areas are found within the late

Cretaceous Pierre Formation in eastern North Dakota, and Pleistocene glaciolacustrine sediments of the Sherack and Brenna Formations in the neighboring Red River Valley.

There are no recorded historical earthquakes in Nelson 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 Nelson 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 Nelson 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 Nelson County, this would include the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna.

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. In nearby Devils Lake, a road experienced a landslide as the rising lake caused bank instability. Creation of the Tolna Coulee and other waterway control structures has decreased the reoccurrence to lose infrastructure to landslides.

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 Nelson County disaster declarations resulting from geologic hazards, which included landslides and mudslides in the declaration.

Table 4.13.3A Nelson 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)	Nelson 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.

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	*No regional history*					
	No local history					
	100 years		Landslide Damaging Roads			
	50 years	Earthquake Shaking Felt				
	Annually					
		Negligible	*Limited*	*Critical*	*Catastrophic*	
		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 Nelson 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 Nelson 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 near the Tolna Coulee and major water ways in Nelson County may be damaged by landslides. This was the case near Devils Lake where the expanding lake caused erosion to roadway embankment. The cities and townships in the county are at very low risk.

The potential for significant earthquake losses in Nelson County is marginal.

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.

Nelson County has a "Low" landslide and earthquake rating, and therefore a "Low" overall rating for geologic hazards risk to the county and jurisdictions.

Figure 4.13.5A, Areas with Landslide Risk

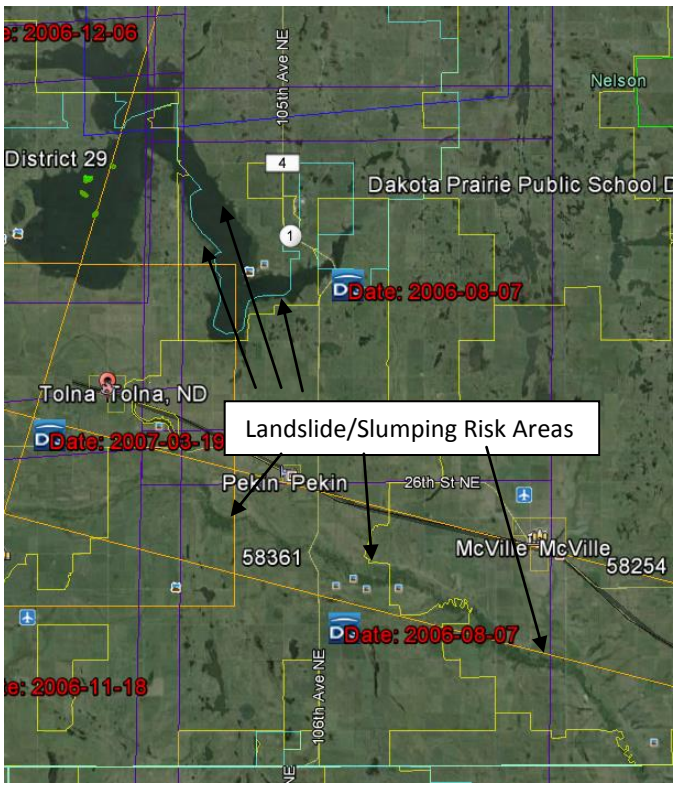


Figure 4.13.5A demonstrates the area along the Sheyenne River that is at risk for landslides. Flowing river water may erode the river banks causing a slump or landslide to occur. The Sheyenne River at Tolna, Pekin, and south of Pekin to the County line is flowing full all the time because the Sheyenne River carries the releases from Devils Lake and Stump Lake greatly increasing the possibility of a landslide/slump to occur. The second area is along Stump Lake, especially in the southeast part of the lake where the prevailing northwest winds cause wave action that may erode the banks and cause slumpling or landslides to occur.

Loss Estimates

The 2011 North Dakota landslides cost $5.6 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 Nelson 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. Nelson 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. Nelson 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

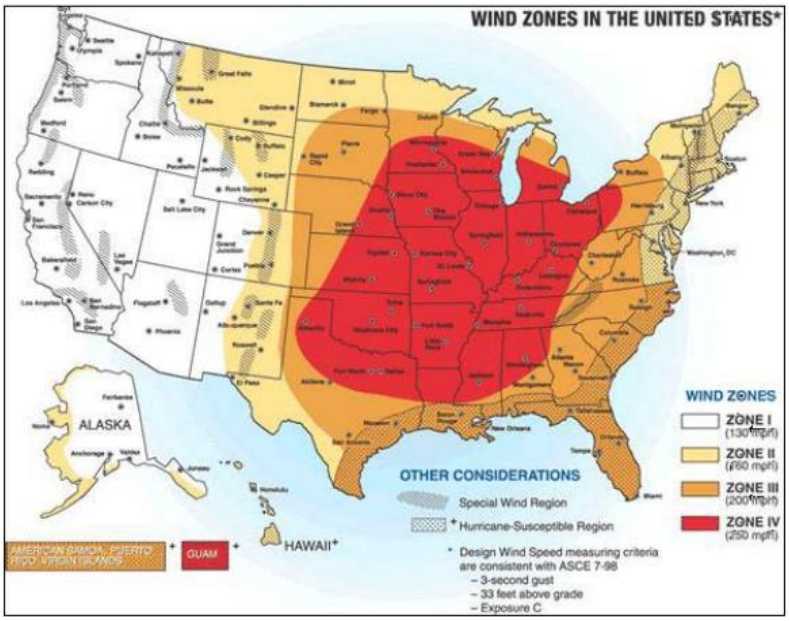
Frequency	Possible	
Impact	Limited	
Risk Class	C	
Seasonal Pattern	None	
Duration	Hours/Days-unpredictable and dependent on specific event.	
Speed of Onset	Adequate warnings-National Weather Service does issue high wind watches and warnings.	

4.14.1 Description

Strong winds can occur year-round in North Dakota and therefore in Nelson 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 Nelson County falls into Zone II. Winds speeds reach up to 160 miles per hour in Zone II. No special wind regions are identified in Nelson County.

Figure 4.14.1A United States Wind Zones



Source: FEMA

4.14.2 Geographic Location

High winds can occur anytime and anyplace, including Nelson County. However there are no recent high wind events reported by the National Climatic Data Center in Nelson County. The Grand Forks National Weather Service reports the strongest documented wind speed is 81mph reported at Tolna August 1994 from a thunderstorm. The highest documented non thunderstorm wind was 76 mph November 1st 1999, after a strong early season storm moved through.

4.14.3 Previous Occurrences

The National Climatic Data Center reports there were no high wind events reported in Nelson County other than those mentioned above. High winds in Nelson County are usually associated with 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 Nelson County. It is important to note that high wind events may occur across several counties at once.

In Nelson County, this would include the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna.

North Dakota has had only one major federal disaster declaration related to high winds, DR 1483, which did not include Nelson County.

4.14.4 Probability and Magnitude

Based on location, Nelson 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 Nelson 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 of 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 Grand Forks 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. Nelson County has approximately xxx mobile homes. Given approximately 2.56 people per housing unit in Nelson County, roughly 3,571 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 Nelson 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 Nelson County wind that damages these homes.

Table 4.14.5E Structural Build of Nelson 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 Nelson County Tax Equalization Director

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

Location	**Count**
Urban Residential Structures	39
Rural Residential Structures	15

Source: Nelson County Tax Equalization Director

Another consideration that must be taken into account concerning wind damage is vulnerable populations. Figure 4.14.5G lists the vulnerable population locations in Nelson County. High winds can damage the structures housing vulnerable populations requiring evacuation, relocation, and possible medical care for the vulnerable population.

Figure 4.14.5G Vulnerable Populations

Facility Name	Population
Nelson County Health System Hospital (McVille)	19 Bed
Nelson County Health System Care Center (Nursing Home) (McVille)	39 Bed
Summerfield Assisted Living Facility (McVille)	19 Apartments
Good Samaritan Nursing Home (Lakota)	49 Beds
Prairie Rose Assisted Living Center (Lakota)	16 Apartments
Aneta Park View Health Center (Nursing Home)	39 Beds
Lakota Elementary School	92 Students
Lakota High School	100 Students
Dakota Prairie High School (McVille)	132 Students
Dakota Prairie Elementary School (Petersburg)	138 Students

Source: Nelson County Emergency Manager

The Nelson County cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna 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, Nelson County has been relatively rated low.

To refine and assess the relative vulnerability of Nelson 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 4.14.5E summarizes the calculated ranges applied to determine the overall vulnerability ranking.

Table 4.14.5E 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 Nelson 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 4.14.5F shows the vulnerability ranking for

Nelson County derived from the analysis of data from these sources. The overall vulnerability score is Low for Nelson County, based on the rankings above.

Table 4.14.5F Nelson 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	$0	$0	$486,024	3.2	$8,036,000	$77,333,000	$177,852	$199,834	$19,983	20

The overall vulnerability is shared equally between the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg and Tolna.

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 Nelson County.

As mentioned previously, total crop insurance payments for insurable crops due to wind events in Nelson 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 Nelson County from 2003-2012 totaled $199,834 or about $19,983 annually. (Risk Management Agency, 2003-2012)

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 Providers

	Nodak Electric Cooperative	Western Area Power	Ottertail Power Company
Aneta			X
Lakota	X	X	
McVille			X
Michigan	X		X
Pekin			X
Petersburg			X
Tolna			X
Rural Nelson 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 Nelson 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. Nelson 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 Nelson 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 Nelson 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 Nelson County Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather
Moderate-High Hazard Class B	Communicable Disease Hazardous Material Release Shortage or Outage of Critical Materials or Infrastructure Windstorm
Moderate Hazard Class C	Dam Failure Drought Homeland Security Incident Transportation Accident Wildland Fire
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards

Table 4.15B City of Aneta Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather
Moderate-High Hazard Class B	Communicable Disease Hazardous Material Release Shortage or Outage of Critical Materials or Infrastructure Windstorm
Moderate Hazard Class C	Dam Failure Drought Homeland Security Incident Transportation Accident Wildland Fire
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards

Table 4.15C City of Lakota Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	**Flood** **Severe Summer Storm** **Severe Winter Weather**
Moderate-High Hazard Class B	**Communicable Disease** **Hazardous Material Release** **Shortage or Outage of Critical Materials or Infrastructure** **Windstorm**
Moderate Hazard Class C	**Dam Failure** **Drought** **Homeland Security Incident** **Transportation Accident** **Wildland Fire**
Low Hazard Class D	**Urban Fire or Structure Collapse** **Geologic Hazards**

Table 4.15D City of McVille Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather
Moderate-High Hazard Class B	Transportation Accident Hazardous Material Release Shortage or Outage of Critical Materials or Infrastructure Windstorm
Moderate Hazard Class C	Dam Failure Drought Communicable Disease Homeland Security Incident Wildland Fire
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards

Table 4.15E City of Michigan Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather
Moderate-High Hazard Class B	Communicable Disease Hazardous Material Release Shortage or Outage of Critical Materials or Infrastructure Windstorm
Moderate Hazard Class C	Dam Failure Drought Homeland Security Incident Transportation Accident Wildland Fire
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards

Table 4.15F City of Pekin Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather
Moderate-High Hazard Class B	Communicable Disease Hazardous Material Release Shortage or Outage of Critical Materials or Infrastructure Windstorm
Moderate Hazard Class C	Dam Failure Drought Homeland Security Incident Transportation Accident Wildland Fire
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards

Table 4.15G City of Petersburg Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather
Moderate-High Hazard Class B	Communicable Disease Hazardous Material Release Shortage or Outage of Critical Materials or Infrastructure Windstorm
Moderate Hazard Class C	Dam Failure Drought Homeland Security Incident Transportation Accident Wildland Fire
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards

Table 4.15H City of Tolna Hazard Prioritizations

Level/Class	Hazard
High Hazard Class A	Flood Severe Summer Storm Severe Winter Weather
Moderate-High Hazard Class B	Communicable Disease Hazardous Material Release Shortage or Outage of Critical Materials or Infrastructure Windstorm
Moderate Hazard Class C	Dam Failure Drought Homeland Security Incident Transportation Accident Wildland Fire
Low Hazard Class D	Urban Fire or Structure Collapse Geologic Hazards

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, 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 Nelson County and the incorporated jurisdictions of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna 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. Projects identified by specific jurisdictions are listed with the name of the jurisdiction.

The framework of Nelson 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 Nelson 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 Nelson 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 Nelson County and its communities from the impacts of natural and technological hazards as well as adversarial threats.

2015 GOALS AND OBJECTIVES

Goal 1: Promote the use of mitigation measures that reduce the impacts of hazards.

Objective 1.1: Improve the disaster resistance of new construction and improvements.

Objective 1.2: Increase early warning capabilities.

Objective 1.3: Raise awareness of personal mitigation activities through public education.

Objective 1.4: Protect critical infrastructure including water, electricity, natural gas, storm sewer, sanitary sewer, and roads.

Objective 1.5: Protect the public and government property during critical infrastructure outages.

Objective 1.6: Improve data for analyzing hazards and vulnerabilities.

Goal 2: Protect the public from effects of summer storms and winter weather.

Objective 2.1: Increase hazard awareness and warning capabilities.

Objective 2.2: Provide safe shelters for the public.

Objective 2.3: Reduce drifting snow and hazardous visibilities along key roadways.

Objective 2.4: Provide all hazards education on personal protection.

Goal 3: Reduce flood losses to public and private property.

Objective 3.1: Improve drainage in populated areas.

Objective 3.2: Improve roads and bridges to reduce losses on flood-prone roadways.

Objective 3.3: Reduce repetitive flood losses.

Objective 3.4: Promote sound land use in the floodplain.

Objective 3.5: Stabilize banks prone to erosion and washouts.

Objective 3.6: Promote flood research and planning.

Objective 3.7: Construct and maintain sound flood control structures.

Goal 4: Reduce possible wildland/rural fire losses to public and private property.

Objective 4.1: Keep wildfires from entering populated areas.

Objective 4.2: Encourage individuals to reduce the wildland/rural fire threat to their properties.

Objective 4.3: Prevent wildland/rural fire ignitions.

Goal 5: Minimize losses from human-caused hazards.

Objective 5.1: Understand and prevent hazardous material releases.

Objective 5.2: Reduce the probability of large loss urban fires.

Objective 5.3: Increase security at critical facilities.

Goal 6: Provide life safety services.

Objective 6.1: Ensure the availability of Ambulance Services to all Nelson County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Objective 6.2: Ensure the availability of Law Enforcement Services to all Nelson County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

Objective 6.3: Ensure the availability of Fire Department Services to all Nelson County Citizens by providing the appropriate level of staffing, equipment, training, and coordination of services.

5.2 Mitigation Actions

This section describes the intentions of Nelson 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 Nelson 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 Nelson 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 Nelson 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	Priority
Nelson 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	Public media notice/ Nelson County Highway Department	Flooding	On-going	Medium
Nelson County	Inform the public of the potential for flooding. Due to geography, a flood situation only occurs along the Sheyenne and Forest River watersheds and in pot hole areas around most major towns. 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 Highway Department has repaired most of the roads that were damaged.	Situation Assessment – Preparation for a potential flood and moisture content.	$500 / Nelson County Emergency Management	Flooding	On-Going	Medium
Nelson County	Adequate supply of sandbags in the county. Available source of sand. Maintain a list of contractors. Working agreements with local citizens with equipment capable of assisting. County and cities maintain a supply of sandbags and sand for flood victims.	Resource Management	$420 / Nelson County Emergency Management	Flooding	Deleted in 2015	Medium
Nelson County	Create water retention facilities. Dams were completed and improved. There is not enough of a flood problem to dictate the need for a long-term study or more retention facilities.	Excess amounts of drainage in a watershed at one time.	Unknown / Nelson County Water Board	Flooding	Deleted (verbiage misleading)	Low
Nelson County	Snagging and clearing of affected channels.	River channel maintenance	$200,000 / Nelson County	Flooding	On-Going	Medium

	Ongoing snagging and clearing operations. Water Board can confer with State Water Commission for additional help in the future.		Water Board and State Water Commission			
Nelson County	The Water Board is attempting to study and implement this project solely on its own. The State Water Commission would be a good source of information, assistance, and possible cost sharing.	Great amounts of water meet at the confluence of Creek drainage.	$200,000 / Nelson County Water Board and State Water Commission	Flooding	Deleted	Medium
Nelson County	Inform population of flood insurance program. Publications and assistance with the NFIP from the State Water Commission. Currently Nelson County and all cities are unmapped.	Population living and building in the floodplain.	$500 / Nelson County Commission	Flooding	Completed 2009	Medium
Nelson County	Maintain existing system. Inform the public prior to flood event through informational meetings and media. Law Enforcement personnel to patrol areas and assess situation. Communities do have sirens.	Lack of adequate county-wide warning system.	Annual Maintenance Costs / Nelson County Emergency Management	Flooding	Deleted (not valid project)	Medium
Nelson County	To make the public aware of the roads that are impassible and/or closed. Inform media and have them announce with roads are impassible and/or closed.	With a number of highways crossing through the county, there is a great possibility that roads will become impassible during and after a winter storm.	$0 / Nelson County Law Enforcement	Winter Storms	Deleted in 2015	High
Nelson County	Contact between officials and citizens. Recruit volunteers to assist in checking on the welfare of handicapped, elderly, and isolated rural citizens.	Handicapped, elderly, and isolated rural citizens	$120 per person per event/ Nelson County Emergency Management/ District Health Unit/ Highway Dept.	Winter Storms	On-going	High
Nelson County	To make the public aware of the hazards of a winter storm. Use of media, workshops, exercises, and literature	Public awareness	Unknown / Nelson County Emergency Management	Winter Storms	Deleted (moved to Public Awareness only projects)	Medium

	to inform the public of the hazards of a winter storm.					
Nelson County	Inform the public of the importance of adopting plans and procedures for tornado drills. Inform the public through media, exercises, and literature of the proper tornado drill procedures.	The adoption of tornado drill procedures.	Unknown / Nelson County Emergency Management	Summer Storms	Deleted (moved to Public Awareness only projects)	High
Nelson County	Implement training programs for the public. Provide annual workshops and training sessions	Improve county-wide storm spotter network	Unknown / Nelson County Emergency Management	Summer Storms	Deleted (offered at no cost by local news stations)	Medium
Nelson County	To make the public aware of the hazards of a summer storm. Use of media, workshops, exercises, and literature to inform the public of the hazards of a summer storm.	Public awareness	Unknown / Nelson County Emergency Management	Summer Storms	Deleted (moved to Public Awareness only projects)	High
Nelson 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 dangers of chemical.	Unknown / Nelson County Emergency Management	Hazardous Materials	Deleted (moved to Public Awareness only projects)	High
Nelson County	Training of personnel in the safety procedures of chemical spills. Provide training sessions and workshops for individuals that would be involved in dealing with chemical spills.	Since Nelson County has a major highway (US 2) through it and is also an agricultural county, there is a risk of commercial and agricultural chemical spills.	$175 per hour / Nelson County Emergency Management	Hazardous Materials	On-going	High
Nelson County all fire departments	Implement public awareness campaigns. Use of media and literature to inform the public of the hazards of a grass fire and how to prevent them.	Grass fire.	Unknown / Fire departments	Urban Fires	Deleted (moved to Public Awareness only projects)	High
Nelson County all fire departments	City and rural maintenance crews be equipped with radios. Request city and county officials to provide proper equipment.	Blocked roads causing delayed emergency response.	15 at $1500 per radio / Fire departments	Urban Fires	On-going	High
Nelson County all fire departments	Inventory equipment to find out what is needed. Use available funds and seek alternative support.	Lack of proper equipment in small fire districts.	Unknown / Fire departments	Urban Fires	Deleted (not valid project)	High
Nelson County all	Complacency of the	Public Awareness	Unknown / Fire	Urban Fires	Deleted	High

fire departments	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.		departments		(moved to Public Awareness only projects)	
Nelson County all fire departments	Implement public awareness campaigns. Use of media and literature to inform the public of the hazards of a grass fire and how to prevent them.	Grass fire	Unknown / Fire Departments	Rural Fires	Deleted (moved to Public Awareness only projects)	High
Nelson County all fire departments	City and rural maintenance crews be equipped with radios and cell phones. Request city and county officials to provide proper equipment.	Blocked roads causing delayed emergency response	$100,000 / Fire Departments	Rural Fires	On-going	High
Nelson County all fire departments	Inventory equipment to find out what is needed. Use available funds and seek alternative support.	Lack of proper equipment in small fire districts.	Unknown / Fire Departments	Rural Fires	Deleted (not valid project)	High
Nelson County all fire departments	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	Unknown / Fire departments	Rural Fires	Deleted (moved to Public Awareness only projects)	High
Nelson County Fire Departments	Inform the public of the fire index and regulations regarding burning during high fire indexes. Place a burning ban in drought areas	Increased Fire Potential	$0 / Fire Departments	Drought	On-going	High
Nelson County	Keep public informed as to crucial water supplies and ban unnecessary use of water. Conserve water and locate foreign water supplies	Possible water shortage	Unknown / Nelson County Emergency Management	Drought	Deleted (verbiage not correct)	Medium
Nelson County	Meet with local farm	Loss of Crops	Unknown /	Drought	Deleted	Medium

	service agency for possible assistance. Purchase crop insurance		Nelson County Extension Agent			
Nelson County	Identify leader(s) of the organization and control situation. Meet with leader(s) of organization to resolve the differences in the conflict.	Rioting, loss of lives, or terrorist attacks	Unknown / Nelson County Law Enforcement	Homeland Security	Deleted	Medium
Nelson County	Identify temporary medical facilities and morgues. Obtain agreements for use of facilities.	Congestion of medical facilities	Unknown / Nelson County Medical Personnel and Law Enforcement	Transportation Accidents	Deleted	Medium
Nelson County	Training of emergency personnel. Provide adequate training for responding and emergency personnel and conduct training exercises.	Lack of specialized training	Unknown / Nelson County Emergency Management	Transportation Accidents	Deleted	Medium
Nelson County	Create evacuation plans. Meet with local officials to organize an evacuation plan and inform the public of evacuation procedures	Evacuation	$3500 / Nelson County Emergency Management	Dam Failure	Completed 2008	
Nelson County	Inform the public of federal assistance programs. Conduct public meetings and publish news releases	Property Damage	Unknown / Nelson County Emergency Management	Dam Failure	Deleted	Medium
Nelson County	Submit notices to suppliers stating regulations. Use of a voucher system to reduce hoarding of critical materials.	Allocation of resources	Unknown / Nelson County Emergency Management	Shortage of Critical Materials	Deleted	Medium
Nelson County	To make the public aware of shortages. Conduct public meetings and publish news releases.	Public Awareness	Unknown / Nelson County Emergency Management	Shortage of Critical Materials	Deleted	Medium
Nelson County	Education and outreach of the NFIP program to insurance agents, building permit office, and realtors in the county	Public Awareness	Unknown / Nelson County Emergency Management	Flooding	On-going	High
Aneta	Repair streets in various locations in city	Safety for emergency personnel	$40,000/ City of Aneta	All Hazards	Carried Over	High
Aneta	Install new siren	Warning signal for disasters	$13,100 / City of Aneta	All Hazards	Completed	High
Pekin	Stump Lake Park install siren	Alert residents and tourists of disasters	$15,000 / City of Pekin / Nelson County	Summer Storms	Completed	High
Pekin	Stump Lake Park install	Protect loss of	$100,000 / City	Flooding	Carried Over	High

	permanent dike with rip rap on shoreline	property	of Pekin / Nelson County			
Pekin	Stump Lake Park turn pavilion into a safe house structure	Protect life	$500,000 / City of Pekin / Nelson County	Summer Storms	Carried Over	Medium
Nelson County Townships N ½ Sec 19 151 N 61 W Level TWP.	Channelize natural coulee and remove sediment to protect the population of Nelson County and Lower Devils Lake Basin	Protect life	$2 Million / Nelson County Water Resource District / Nelson County	Flooding	Completed	High
Lakota	Update tile line used for emergency with a new electric pump station including electricity line and components. Project would be operated to dewater landfill and farm yards and protect railroad bed and 2 township roads.	Place safety to roadways for emergency personnel	$79,000 / Nelson County Water Resource District / Nelson County	Flooding	Carried Over	High
Michigan	Place a sheet water level and create the acceptable level at 1504 msl and put in a pump station system to operate annually for flood damage reduction for future years as well as the present need.	Remove unacceptable levels of sheet water (flood water) and have a managed discharge. It will assist in protecting Nelson County roads, one railroad track function, the city of Michigan, its homes, streets, sewer and well throughout the area.	$1.7 Million / Nelson County Water Resource District / Nelson County	Flooding	75% completed, to be completed in summer of 2015	High
Nelson County Lee Township NW ¼ Sec 22-149-58	Place 18" tile in or near location for sheet water flood control	Remove flood water from townsite to protect homes, basements, and TWP road	$83,000 / Nelson County Water Resource District / Nelson County	Flooding	Carried Over	Low
Nelson County Bridges 32-101-2.9, 32-108-2.9, 32-107-2.9, 32-11-31.0, 32-114-32, 32-115-32, 32-112-34, and 32-19-35	Install bridge approach guard rails	Protect life	$360,000 / Nelson County	Transportation Accidents	Deleted in 2015	Medium
Nelson County - County Bridges 3222, 3223, and 3224	Replace wood cattle crossing bridges with concrete structures	Protect life and loss of property, possible bridge collapse	$225,000 / Nelson County	Transportation Accidents	Deleted in 2015	Medium
Nelson County	Replace all county road warning and regulatory signs with high intensity signs to meet DOT 2012 standards	High visibility signage improves driver awareness of hazards	$250,000. Nelson County	Transportation Accidents	Completed	High
Nelson County – (1) 40th St. NE from	Grade raise to include rip rap	Make road accessible for	$2 Million / Nelson County	Flooding	Deleted in 2015	High

99th Ave NE east ¼ mile and west ¼ mile, and (2) Co. Rd. 22 from 1.7 miles south of Co. Rd. 1 extending 1.75 miles		emergency personnel				
Petersburg	Repair city lagoon. Rising water for the last 20 years and walls have been deteriorating	Protect human and animal life and protect property	$500,000 / City of Petersburg	Flooding, Communicable Disease	Ongoing	High
Petersburg	Install electrical transfer switch equipment at city lift station and city community center. Community center is used as emergency command center.	If power outage occurs it would prevent sewer from backing up into homes.	$15,000 / City of Petersburg	Flooding, Summer Storms, Winter Storms	Carried Over	Medium
Petersburg	Raise 1st Ave street level, add drain tile under street and gravel lot to the North.	Improve road to reduce flood risk and damage to road make accessible for emergency personnel	$150,000 / City of Petersburg	Flooding, Summer Storms, Winter Storms	Carried Over	High
Petersburg	Replace city sewer mains in city	Streets are sinking due to sewer lines shifting or settling. Prevent contamination of soil underground	$2 Million / City of Petersburg	Flooding, Communicable Disease	Carried Over	Medium
Pekin	City Hall make into safe house for evacuation and shelter	Protect life	$20,000 / City of Pekin	All Hazards	Completed	Medium
Pekin	Big Park Drill hole and install culvert down 15 ft. into sand or install permanent pump and hoses 300 ft. or build dike near homes	Prevent flooding of homes	$10,000 / City of Pekin	Flooding	On Going	Medium
McVille	Manhole relining	Adequate drainage to prevent overland flooding and sewer backups	$12,000 / City of McVille	Flooding	Carried Over	Medium
McVille	Purchase bobcat for snow removal, cleaning drainage areas, etc.	Clear open roads for emergency personnel	$30,000 / City of McVille	Flooding, Winter Storms	Carried Over	Low
McVille – E Felton Ave., Vail Ave. and Hamlin St., Main St. and Hwy 15, Sheyenne St. and Berwick Ave.	Repair storm drains. Low areas and inadequate culverts cause flooding on streets	Prevent overland flooding and flooding of homes	$100,000 / City of McVille	Flooding, Summer Storms	Carried Over	High
McVille	Install helipad on West Vail Ave. for Air Ambulance	Protect life access for air ambulance for hospital	$7,500 / City of McVille	All Hazards	Carried Over	Medium
McVille	S. Hwy 15 and S. Main St. Install water lines and fire hydrants	Protect life, property, prevent hazards, loss of	$100,000 / City of McVille	Urban and Rural Fires	Carried Over	High

		businesses				
Pekin	Purchase generator for water wells	Prevent loss of water to entire city	$8,500 / City of Lakota	All Hazards	Completed	Medium
Lakota	Purchase generator for lift station	Prevent loss of water to city	$8,500 / City of Lakota	All Hazards	Completed	Medium
Lakota	Establish underground circuit from substation into town	Prevent power lines from being downed	$336,216 / City of Lakota	Summer storms and Winter Storms	Completed	High
Michigan	Replacing of city sewer mains which would prevent infiltration due to the high water table caused by excessive rainfall and spring runoff	Reduce flow and prevent sewage backup due to lift station failure also prevent further damage to the city's lagoon system caused by water exceeding normal levels	$787,000 / City of Michigan	Flooding, Summer Storms	Carried Over	High
Michigan	Cleaning of vegetation and cleaning of Michigan drain to Lake Laretta	Reduce the risk of water runoff not being able to move to Lake Laretta.	$2,500 per mile / City of Michigan	Flooding, Summer Storms	Ongoing	Medium
Michigan	Replace drainage system, street and sewer system	Prevent sewer backup into homes	$300,000 / City of Michigan	Flooding	Carried Over	High
Michigan	Building of Michigan Spillway to dewater the Lake Laretta basin	Prevent loss of property, reduce flooding of homes, prevent sewer backup	$1.6 Million / City of Michigan	Flooding	Carried Over	High
Michigan	Install electrical hookups at second lift station for portable generator during power outage	Prevent problems with sewer system	$2,500 / City of Michigan	Summer Storms, Winter Storms	Completed	Medium
Michigan	Development of the Michigan Civic Center into an evacuation and shelter safe house	Prevent loss of life, provide location for medical assistance	$20,000 / City of Michigan	Summer Storms, Winter Storms, Flooding, Fire, Transportation Accidents	Completed	Low
Nelson County	Study sites along Sheyenne River systems to work with other counties.	Prevent flooding, damage and drainage problems in Nelson County as well as downstream communities.	$50,000 / Nelson County Water Resource District / Nelson County	Flooding	Carried Over	Medium
Tolna	Repavement of Main Street	Prevent ice buildup on main street through city	$400,000 / City of Tolna	Winter Storms	Carried Over	High
Tolna	Culvert work and reshape gravel streets	Prevent flooding of homes from overland spring flooding	$50,000 / City of Tolna	Flooding	Carried Over	High
Nelson County	Use of media, workshops, exercises, and literature to inform the public of the	To make the public aware of the hazards of a winter storm	Staff time / Nelson County Emergency Management	Winter Storms	On-going	Medium

	hazards of a winter storm.					
Nelson County	Inform the public through media, exercises, and literature of the proper tornado drill procedures.	Inform the public of the importance of adopting plans and procedures for tornado drills.	Staff time / Nelson County Emergency Management	Summer Storms	Deleted in 2015	Medium
Nelson County	Provide annual workshops and training sessions	Implement training programs for public	Staff time / Nelson County Emergency Management	All Hazards	Deleted in 2015	Medium
Nelson County	Use of media, workshops, exercises, and literature to inform the public of the hazards of a summer storm.	To make the public aware of the hazards of a summer storm	Staff time / Nelson County Emergency Management	Summer Storms	On-going	Medium
Nelson County	Provide informational meetings and brochures	Encourage dealers to inform employees and customers of dangers and safety procedures that must be followed	Staff time / Nelson County Emergency Management	All Hazards	Deleted in 2015	Medium
Nelson County	Use of media and literature to inform the public of the hazards of a grass fire and how to prevent them	Implement public awareness campaigns	Staff time / Nelson County Emergency Management	Rural Fire and Urban Fires	On-going	Medium
Nelson County	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	Complacency of the people in the United States is a problem in urban fire public awareness	Staff time / Nelson County Commissioners	Rural Fire and Urban Fires	Deleted in 2015	Medium

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, Nelson County 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. Nelson County and city officials have been through many 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 #	Action (Project)	Hazard Mitigated	Goal and Objective ID	Affected Jurisdictions	Lead Agency	Estimated Cost	Potential Funding Sources
1	Conduct an emergency management exercise to validate the Tolna Dam Emergency Action Plan that was developed in September 2011	Dam Failure Flood	Goal 3, Objective 3.6	Nelson County	Nelson County Water Board, ND Highway Department, ND State Water Commission	$2,500	Emergency Management and Water Board budgets. Possible exercise grant funds.
2	Install helipad in McVille on West Vail Ave for Air Ambulance to give McVille Hospital Air Ambulance access.	Disease	Goal 6, Objective 6.1	Nelson County	McVille City Council, McVille Hospital Board	$25,000	McVille Hospital, County funds, grants
3	Conduct an Immunization Campaign focusing on children's immunizations	Disease	Goal 1, Objective 1.3	Nelson county	Nelson County Public Health, Nelson County emergency Manager	$2,500	Nelson County Public Health
4	Construct a permanent dike including a rip-rapped shoreline to stop wave erosion and stabilize bank of the Stump Lake Park Peninsula which will protect the pavilion.	Flood	Goal 3, Objectives 3.5, 3.7	Nelson County	Nelson County Commission, Nelson County Park Board, Nelson County Water Board	$1,000,000	Nelson County Commission, State Water Commission, Hazard Mitigation Grant
5	Snagging and removing debris and clearing water channels from vegetation to aid in water movement. Channel locations are shown on Attachment A.	Flood	Goal 3, Objectives 3.1, 3.3, 3.7	Nelson County	Nelson County Commission, Nelson County Water Board	$500,000	Nelson County Water Board, State Water Commission, Hazard Mitigation Grant
6	De-water Lakota landfill, affected farm yards, and two township roads in sections 21 and 22 of Lakota Township, and the railroad bed by replacing the tile line and adding a new electric pump station including electrical line and components.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Lakota City, Lakota Township, Nelson County	Lakota City Council, Lakota Township Board, Nelson County Commission, Nelson County Water Board	$1,000,000	Nelson County Water Board, State Water Commission, Hazard Mitigation Grant, Lakota City Commission

7	Assess drainage out of the city of Lakota and install proper sized culverts in the vicinity of Sections 21 and 22 of Lakota Township.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Lakota City, Lakota Township, Nelson County	Lakota City Council, Lakota Township Board, Nelson County Commission, Nelson County Water Board	$35,000	Nelson County Water Board, Nelson County Highway Department, Hazard Mitigation Grant
8	Place 18" tile in Lee Township, NW ¼ Section 22, T149-R58 to protect Kloten, homes, and a township road. (Vicinity of the unincorporated village of Kloten)	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Nelson County, Lee Township	Nelson County Commission, Nelson County Water Board, Lee Township Supervisors	$50,000	Nelson County Water Board, State Water Commission, Hazard Mitigation Grant
9	Identify vulnerable sites along the Sheyenne river to prevent erosion and flood damage along the Sheyenne River and complete river bank protection through rip-rap, vegetation planting, or channel modification.	Flood	Goal 3, Objectives 3.5	Nelson County, Dayton, Osago, Bergen, Nesheim, and Lee Townships.	Nelson County Commission, Nelson County Water Board	$250,000	Nelson County Water Board, State Water Commission, Hazard Mitigation Grant
10	Publish a public notice in the fall notifying landowners to cut grasses and weeds along county and township roads to keep culverts cleared and to prevent the collection of drifting snow.	Flood, Transportation, and Severe Winter Weather	Goal 2, Objective 2.2	Nelson County Commission, Nelson County Highway Department, and the Township Boards of Alder, Bergen, Central, Forde, Leval, Melvin, Clara, Lee, Michigan, Dahlen, Nash, Dayton, Illinois, Nesheim, Dodds, Ora, Enterprise, Hamlin, Lakota, Osago, Rubin, Rugh, Sarnia, Field, Peters burg, Wamduska, and Williams Townships.	Nelson County Commission, Nelson County Highway Department, and the Township Boards of Alder, Bergen, Central, Forde, Leval, Melvin, Clara, Lee, Michigan, Dahlen, Nash, Dayton, Illinois, Nesheim, Dodds, Ora, Enterprise, Hamlin, Lakota, Osago, Rubin, Rugh, Sarnia, Field, Peters burg, Wamduska, and Williams Townships.	$500	Nelson County Highway Department
11	Severe Winter Weather Awareness Campaign	Severe Winter Weather	Goal 1, Objective 1.4; Goal 2, Objective 2.4	Nelson County	Nelson County Emergency Managers	$2,500	Emergency Management Budget
12	Re-line sewer mains to prevent water from the high water table entering the sewage system	Flood	Goal 1, Objective 1.4	Lakota	Lakota	$500,000	Lakota City funds, grant funds
13	Raise the level of 1st Avenue and add drain tile under the street and gravel lot to the north of 1st Avenue to prevent street flooding	Flood	Goal 1, Objective 1.4	Petersburg	Petersburg	$150,000	Petersburg, Hazard Mitigation Grant

14	Flood Public Awareness	Educate the public on flood hazards	Goal 1, Objective 1.3; Goal 2, Objective 2.4; Goal 3, Objective 3.6	Nelson County	Nelson County Emergency Manager, Nelson County Water Board	$2,500	Emergency Management budget
15	Do a grade raise on County Road #22 from ND Highway 15 to US Highway 2	Flood	Goal 1, Objective 2.4; Goal 3, Objective 3.2; Goal 6, Objective 6.1, 6.2, 6.3	Nelson County	Nelson County Highway Department, Nelson County Commission	$900,000	Hazard Mitigation Grant
16	Repair Petersburg's City Lagoon due to deteriorating lagoon berms due to rising water over the last 20 years in the lagoon area.	Flood, Severe Summer Storms	Goal 3, Objectives 3.3, 3.5	Petersburg	Petersburg City Council	$50,000	Hazard Mitigation Grant
17	Install electrical transfer switch equipment at city lift station.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Petersburg	Petersburg City Council	$5,000	Hazard Mitigation Grant
18	Clean out the 1,000 feet of the US Highway 2 ditch to allow water run-off to continue running to the east and then into the water channel going to the north. This will allow runoff water from backing up at the intersection of 4th Street and 4th Avenue and allow the water to drain into the slough at the southeast edge of town instead of raising the water table in the southern art of the city.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Petersburg	Petersburg City Council	$20,000	Petersburg, ND Department of Transportation, Hazard Mitigation Grant
19	Install 30 KW Generator at city lift station.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Petersburg	Petersburg City Council	$20,000	Hazard Mitigation Grant
20	Assess the sinking of city streets due to high water table causing shifting/settling of sewer lines and conduct repairs.	Flood, Hazardous Materials	Goal 3, Objectives 3.1, 3.2	Petersburg	Petersburg City Council	$30,000	Petersburg, Hazard Mitigation Grant
21	Assess the situation and either drill a hole 15 feet deep into the sand soil substructure or install a permanent pump and 300 feet of hoses at Big Park to de-water an area to protect homes.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Pekin	Pekin City Council	$25,000	Pekin, Hazard Mitigation Grant

22	Reline the sewer system manholes to prevent overland flooding and sewer backups.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	McVille	McVille City Council	$150,000	McVille, Hazard Mitigation Grant
23	Reline the sewer system manholes to strengthen them to prevent street damage	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Aneta	Aneta City Council, Aneta Public Works	$150,000	Aneta, Hazard Mitigation Grant
24	Assess the cause and repair storm drains and install adequate culverts to prevent street flooding at E. Felton Ave, Vail Ave, Hamlin Street, Main Street, Highway 15, Sheyenne Street, and Berwick Ave	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	McVille	McVille City Council	$250,000	McVille, Hazard Mitigation Grant
25	Replace Michigan City sewer system to prevent ground water infiltration to sewer system during spring runoff and periods of high rain. This will prevent sewage backup and further city lagoon system damage caused by exceeding lagoon capacity.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Michigan	Michigan City council	$1,000,000	Michigan, Hazard Mitigation Grant
26	Clean drainage channel that runs from the city to Lake Laretta.	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Michigan	Michigan City Council	$25,000	Michigan, County Water Board
27	Construct Michigan Spillway to de-water the Lake Laretta Basin to prevent water from flowing backwards into Michigan	Flood, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Michigan	Michigan Ciy Council	$50,000	Michigan, County Water Board
28	Re-shape gravel streets and re-design and replace culverts to drain the water out of town.	Flood, Transportation, Severe Summer Storms	Goal 3, Objectives 3.1, 3.3, 3.7	Tolna	Tolna City Council	$100,000	Tolna
29	Conduct a Flood Safety and Property Protection Public Awareness Campaign	Flood, Severe Summer Storms	Objective 2.4Goal 3, objective 3.6, Goal 2,	Nelson County	Nelson County Emergency Manager	$1,000	County Emergency Management
30	Conduct an educational campaign and outreach of the NFIP to the public, insurance agents, building permit office, and the real estate agents	Flood, Severe Summer Storms	Goal 1, Objective 1.3; Goal 2, Objective 2.4; Goal 3, Objective 3.6	Nelson County and the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna	Nelson County Commission and the City Councils of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna, and the County Emergency Manager	$1,000	County Emergency Management, State Water Commission
31	Repair the Lagoon Banks and rip-rap them to prevent future damage	Flood	Goal 3, Objective 3.5	Pekin	Pekin City Council	$35,000	Pekin

32	Purchase an ATV with a blade attachment for snow removal to gain access (across a field) to the Lagoon North Pump and South Lagoon.	Flood, Severe Winter Weather	Goal 2, Objective 2.3; Goal 3, Objective 3.5	Michigan	Michigan City Council, Michigan Public Works	$12,000	Michigan City
33	Construct a drain in the Pekin City Park to remove water from nearby homes and the City Park	Flood, Severe summer Storms	Goal 3, Objectives 3.1, 3.3	Pekin	Pekin City Council	$5,000	Pekin, County Water Board, Hazard Mitigation Grant
34	Develop an Emergency Action Plan for McVille Dam	Flood, Dam Safety, Severe Summer Storms	Goal 1, Objective 1.6	Nelson County, McVille	Nelson County Water Board, McVille City Council, Nelson County Emergency Manager	$5,000	Nelson County Water Board, McVille
35	Provide hazardous Material Awareness Training for first responders	Hazardous Materials	Goal 5, Objective 5.1; Goal 6, Objective 6.3	Nelson County and the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna	Nelson county First Responders including law enforcement, fire departments, and emergency medical personnel.	$1,000	North Dakota Firefighters Association
36	Provide hazardous Materials Operational Level Training for first responders	Hazardous Materials	Goal 5, Objective 5.1; Goal 6, Objective 6.3	Nelson County and the cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna	Nelson county First Responders including law enforcement, fire departments, and emergency medical personnel.	$1,000	North Dakota Firefighters Association
37	Install a Court House Security System	Homeland Security Incident	Goal 5, Objective 5.3	Nelson County	Nelson County Commission	$20,000	Nelson County Commission
38	Install Security Systems at all the Nelson county Schools which includes Dakota Prairie (McVille and Petersburg) and Lakota.	Homeland Security Incident	Goal 5, Objective 5.3	Nelson County	School Boards of Dakota Prairie and Lakota School Districts and County Superintendent of Schools	$40,000	School Boards of Dakota Prairie and Lakota School Districts and County Superintendent of Schools, Grants
39	Replace Lakota Water Treatment Plant	Shortage or Outage of Critical Materials, Drought	Goal 1, Objective 1.4	Lakota	Lakota City Council	$750,000	Lakota
40	Replace Lakota Water Tower	Shortage or Outage of Critical Materials, Drought	Goal 1, Objectives 1.2, 1.4	Lakota	Lakota City Council	$1,500,000	Lakota
41	Install a generator at the Lakota Community Center	Shortage or Outage of Critical Materials, , Severe Summer Storms, Severe Winter Weather	Goal 1, Objectives 1.1, 1.4	Lakota	Lakota City Council	$25,000	Lakota, Hazard Mitigation Grant

42	Create shelter supply storage at the Lakota Community Center	Shortage or Outage of Critical Materials, Severe Summer Storms, Severe Winter Weather	Goal 1, Objective 1.5	Lakota	Lakota City Council	$5,000	Lakota, American Red Cross
43	Scope sewer lines and water lines to assess the lines' condition	Shortage or Outage of Critical Materials, Severe Summer Storms, Flood	Goal 1, Objective 1.5	Aneta	Aneta City Council, Public Works	$100,000	Aneta
44	Replace water lines that are identified in dis-repair from scoping project	Shortage or Outage of Critical Materials, Urban Fire	Goal 1, Objective 1.5	Aneta	Aneta City Council, Public Works	$200,000	Aneta
45	Replace Fire Hydrants	Shortage or Outage of Critical Materials, Urban Fire	Goal 1, Objectives 1.4, 1.5	Aneta	Aneta City Council, Public Works	$150,000	Aneta
46	Purchase a generator for Tolna's essential services provided by electricity such as shelters, water, and sewer	Shortage or Outage of Critical Materials, Urban Fire	Goal 1, Objectives 1.1, 1.4	Tolna	Tolna City Council, Public Works	$45,000	Tolna, Hazard Mitigation Grant
47	Establish a Tornado Shelter in Pekin City Hall. Assess structural strength and strengthen structure as necessary for a tornado shelter	Severe Summer Storms	Goal 2, Objective 2.2	Pekin	Pekin City Council	$25,000	Pekin, Hazard Mitigation Grant
48	Add a storm shelter to the Stump Lake Park Pavilion to provide protection for the weekend campers and visitors to the Park.	Severe Summer Storms	Goal 2, Objective 2.2	Nelson County	Nelson County Commission, Nelson County Park Board, Nelson County Emergency Manager.	$25,000	Nelson County Park Board, Hazard Mitigation Grant
49	Install curb stops and gate valves to prevent basement flooding.	Severe Summer Storms	Goal 3, Objective 3.7	Michigan	Michigan City Council, Michigan Public Works	$150,000	Michigan, Hazard Mitigation Grant
50	Install electrical transfer switch equipment at city community center which is used as a community shelter and emergency operations center.	Severe Summer Storms, Severe Winter Storms	Goal 1, Objective 1.5	Petersburg	Petersburg City Council	$5,000	Petersburg, Hazard Mitigation Grant
51	Conduct a Severe Summer Storm Awareness Campaign	Severe Summer Storms	Goal 1, Objective 1.3; Goal 2, Objectives 2.1, 2.4	Nelson County	Nelson County Emergency Manager	$1,000	Nelson county Emergency Management
52	Aneta streets are deteriorating at a rapid rate due to high water tables, conduct necessary street repairs.	Transportation	Goal 1, Objective 1.4	Aneta	Aneta City Council, Aneta Public Works	$200,000	Aneta

53	Redesign and re-pavement of Main Street to improve drainage and prevent ice buildup.	Transportation	Goal 1, Objective 1.4	Tolna	Tolna City Council	$500,000	Tolna
54	Assess County and Townships for snow bank blockage and determine areas where a living snow fence would be a viable project and plant living snow fences as appropriate.	Transportation and severe winter storms	Goal 2, Objective 2.3	Nelson County and Alder, Bergen, Central, Forde, Leval, Melvin, Clara, Lee, Michigan, Dahlen, Nash, Dayton, Illinois, Nesheim, Dodds, Ora, Enterprise, Hamlin, Lakota, Osago, Rubin, Rugh, Sarnia, Field, Peters burg, Wamduska, and Williams Townships.	Nelson County Highway Department, Nelson County Emergency Manager, and the Township Boards of Alder, Bergen, Central, Forde, Leval, Melvin, Clara, Lee, Michigan, Dahlen, Nash, Dayton, Illinois, Nesheim, Dodds, Ora, Enterprise, Hamlin, Lakota, Osago, Rubin, Rugh, Sarnia, Field, Peters burg, Wamduska, and Williams Townships.	$25,000	Hazard Mitigation Grant, Nelson County Commission, Township Boards of: Alder, Bergen, Central, Forde, Leval, Melvin, Clara, Lee, Michigan, Dahlen, Nash, Dayton, Illinois, Nesheim, Dodds, Ora, Enterprise, Hamlin, Lakota, Osago, Rubin, Rugh, Sarnia, Field, Peters burg, Wamduska, and Williams Townships.
55	Repair Michigan City streets especially at two railroad crossings.	Transportation	Goal 1, Objective 1.4	Michigan	Michigan City Council, Michigan Public Works, Burlington Northern Santa Fe Railroad	$200,000	Michigan, Burlington Northern Railroad, ND Department of Transportation
56	Install water lines and fire hydrants on South Highway 15 and South Main Street for fire control.	Urban Fire, Structure Collapse	Goal 5, Objective 5.2	McVille	McVille City Council	$200,000	McVille
57	Conduct an Urban Fire Public Awareness Safety Campaign	Urban Fire, Structure Collapse	Goal 5, Objective 5.2	The cities of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna	The City Councils and Fire Chiefs of Aneta, Lakota, McVille, Michigan, Pekin, Petersburg, and Tolna	$1,000	Nelson County Emergency Management
58	Repair Water Tower	Urban Fire Structure Collapse, Shortage of Critical Materials, Drought	Goal 1, Objective 1.4; Goal 5, Objective 5.2	Michigan	Michigan City Council, Michigan Public Works	$50,000	Michigan
59	Purchase a vehicle to transport firefighting equipment within the Tolna Fire District and to support mutual aid agreements	Urban Fire, Structure Collapse, Wildland Fire, Drought	Goal 6, Objective 6.3	Tolna Fire District	Tolna Fire Department	$50,000	North Dakota Forest Service, Multi-Hazard Mitigation Grant, Firefighter Assistance Grant

60	Install 10-12 Fire Hydrants in Michigan, actual number dependent on final assessment	Urban Fire, Structure Collapse	Goal 1, Objective 1.4; Goal 6, Objective 6.3	Michigan	Michigan City Council, Michigan Public Works	$50,000	Michigan
61	Conduct a Wildland Fire Prevention Awareness Campaign including the meaning of the Fire Danger Index Categories and Controlled Burn procedures.	Wildland Fire, Drought	Goal 4, Objectives 4.1, 4.2, 4.3	Nelson County	Nelson County Emergency Manager	$1,000	Nelson County Emergency Management, Fire Departments
62	Establish a procedure for activating a burn ban based on the Fire Danger Index	Wildland Fire, Drought	Goal 4, Objectives 4.1, 4.2, 4.3	Nelson County	Nelson County Commission, Nelson County Fire Departments	$1,000	County Commission, Nelson County Emergency Management, Fire Departments
63	Place a Michigan/Whitman Fire Department sub-station at Whitman to include sub-station fire equipment, storm shelter, Emergency command Center, water-sewer-electricity and an electrical generator.	Wildland Fire, Urban Fire, Drought	Goal 6, Objective 6.3	Michigan/Whitman Fire District	Michigan/Whit-man Fire District	$250,000	Michigan/Whit-man Fire District
64	Purchase 12 fire suits for fighting wildland fires on CRP land and along railroad tracks.	Wildland Fire, Drought	Goal 6, Objective 6.3	Michigan	Michigan Fire Department, Rubin, Williams, Michigan Townships	$6,000	Michigan Fire District, Hazard Mitigation Grant
65	Purchase front end loader (skid steer) for snow removal, cleaning drainage areas, and building a berm to block a hazardous materials spill from water sources.	Severe Winter Weather, Flood, and Hazardous Materials Incident	Goal 1, Objective 1.5; Goal 5, Objective 5.1	McVille	Mcville	$80,000	McVille
66	Purchase front end loader (skid steer) for snow removal, cleaning drainage areas, and building a berm to block a hazardous materials spill from water sources.	Severe Winter Weather, Flood, and Hazardous Materials Incident	Goal 1, Objective 1.5; Goal 5, Objective 5.1	Aneta	Aneta	$80,000	Aneta
67	Bury electrical power lines in the City of Lakota (Lakota owns its electrical lines)	Windstorm, Severe Summer Storms, Severe Winter Weather	Goal 1, Objectives 1.4, 1.5	Lakota	Lakota City Council, Lakota Public Works	$500,000	Lakota, Hazard Mitigation Grant
68	Review current mutual aid agreements and revise them as necessary	All Hazards	Goal 6, Objectives 6.1, 6.2, 6.3	Nelson county	Nelson County Emergency Manager, All Fire Departments	$1,000	Nelson County Emergency Managment
69	Purchase Interoperable Communications Equipment	All Hazards	Goal 6, Objectives 6.1, 6.2, 6.3	Nelson County	Nelson County Commission, Nelson County Emergency Manager, Nelson County Sheriff	$25,000	Nelson County Commission, Grants

70	Develop and maintain a special needs population data base.	All Hazards	Goal 6, Objectives 6.1, 6.2, 6.3	Nelson County	Nelson County Emergency Manager, Social Services, and Public Health Nurse.	$5,000	Nelson County Emergency Management, Social Services, and Public Health
71	Construct living quarters for hired full-time EMT's to cover Michigan Area Ambulance Territory – 700 Square Miles.	All Hazards	Goal 6, Objective 6.1	Michigan Area Ambulance Territory	Michigan Area Ambulance	$50,000	Michigan Area Ambulance, Public Health Grants

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 Nelson 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: Meets five of the seven STAPLEE criteria
- Medium: Meets four of the seven STAPLEE criteria
- Low: Meets three of the seven STAPLEE criteria

This prioritization will be revisited in the future by the Nelson 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 Nelson County Hazard Mitigation Project Prioritization

ID #	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
1	Conduct an emergency management exercise to validate the Tolna Dam Emergency Action Plan that was developed in September 2011	+	+	+	+	+	+	+	7	High
2	Install helipad in McVille on West Vail Ave for Air Ambulance to give McVille Hospital Air Ambulance access.	+	+	+	+	+	o	+	6	High
3	Conduct an Immunization Campaign focusing on children's immunizations	o	+	+	o	+	+	+	5	High
4	Construct a permanent dike including a rip-rapped shoreline to stop wave erosion and stabilize bank of the Stump Lake Park Peninsula which will protect the pavilion.	+	+	+	+	+	o	+	6	High
5	Snagging and removing debris and clearing water channels from vegetation to aid in water movement. Channel locations are shown on Attachment A.	+	+	+	+	+	o	+	6	High
6	De-water Lakota landfill, affected farm yards, and two township roads in sections 21 and 22 of Lakota Township, and the railroad bed by replacing the tile line and adding a new electric pump station including electrical line and components.	+	+	+	+	+	o	o	5	High
7	Assess drainage out of the city of Lakota and install proper sized culverts in the vicinity of Sections 21 and 22 of Lakota Township.	+	+	+	+	+	o	o	5	High
8	Place 18" tile in Lee Township, NW ¼ Section 22, T149-R58 to protect Kloten, homes, and a township road. (Vicinity of the unincorporated village of Kloten)	+	+	+	+	+	o	+	6	High
9	Identify vulnerable sites along the Sheyenne river to prevent erosion and flood damage along the Sheyenne River and complete river bank protection through rip-rap, vegetation planting, or channel modification.	+	+	+	+	o	o	o	4	Medium
10	Publish a public notice in the fall notifying landowners to cut grasses and weeds along county and township roads to keep culverts cleared and to prevent the collection of drifting snow.	+	+	+	+	+	+	+	7	High
11	Severe Winter Weather Awareness Campaign	+	+	+	+	+	+	+	7	High
12	Re-line sewer mains to prevent water from the high water table entering the sewage system	+	+	+	+	+	+	+	7	High
13	Raise the level of 1st Avenue and add drain tile under the street and gravel lot to the north of 1st Avenue to prevent street flooding	+	+	+	+	+	+	+	7	High
14	Flood Public Awareness	+	+	+	+	+	+	+	7	High
15	Do a grade raise on County Road #22 from ND Highway 15 to US Highway 2	+	+	+	+	+	+	+	7	High
16	Repair Petersburg's City Lagoon due to deteriorating lagoon berms due to rising water over the last 20 years in the lagoon area.	+	+	+	+	+	o	+	6	High
17	Install electrical transfer switch equipment at city lift station. (Petersburg)	+	+	+	+	+	+	+	7	High
18	Clean out the 1,000 feet of the US Highway 2 ditch to allow water run-off to continue running to the east and then into the water channel going to the north. This will allow runoff water from backing up at the intersection of 4th Street and 4th Avenue and allow the water to drain into the slough at the southeast edge of town instead of raising the water table in the southern art of the city.	+	+	+	+	+	o	+	6	High
19	Install 30 KW Generator at city lift station.	+	+	+	+	+	+	+	7	High
20	Assess the sinking of city streets due to high water table causing shifting/settling of sewer lines and conduct repairs.	+	+	+	+	+	+	+	7	High
21	Assess the situation and either drill a hole 15 feet deep into the sand soil substructure or install a permanent pump and 300 feet of hoses at Big Park to de-water an area to protect homes.	+	+	+	+	+	+	+		High
22	Reline the sewer system manholes to prevent overland flooding and sewer backups.	+	+	+	+	+	o	+	6	High
23	Reline the sewer system manholes to strengthen them to prevent street damage	+	+	+	+	+	o	+	6	High
24	Assess the cause and repair storm drains and install adequate culverts to prevent street flooding at E. Felton Ave, Vail Ave, Hamlin Street, Main Street, Highway 15, Sheyenne Street, and Berwick Ave	+	+	+	+	+	o	+	6	High

ID #	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
25	Replace Michigan City sewer system to prevent ground water infiltration to sewer system during spring runoff and periods of high rain. This will prevent sewage backup and further city lagoon system damage caused by exceeding lagoon capacity.	+	+	+	+	+	o	+	6	High
26	Clean drainage channel that runs from the city to Lake Laretta.	+	+	+	+	+	+	o	6	High
27	Construct Michigan Spillway to de-water the Lake Laretta Basin to prevent water from flowing backwards into Michigan	+	+	+	+	+	o	o	5	High
28	Re-shape gravel streets and re-design and replace culverts to drain the water out of town.	+	+	+	+	+	o	+	6	High
29	Conduct a Flood Safety and Property Protection Public Awareness Campaign	+	+	+	+	+	+	+	7	High
30	Conduct an educational campaign and outreach of the NFIP to the public, insurance agents, building permit office, and the real estate agents	+	+	+	+	+	+	+	7	High
31	Repair the Lagoon Banks and rip-rap them to prevent future damage	+	+	+	+	+	+	+	7	High
32	Purchase an ATV with a blade attachment for snow removal to gain access (across a field) to the Lagoon North Pump and South Lagoon.	+	+	+	+	+	+	+	7	High
33	Construct a drain in the Pekin City Park to remove water from nearby homes and the City Park	+	+	+	+	+	+	+	7	High
34	Develop an Emergency Action Plan for McVille Dam	+	+	+	+	+	+	+	7	High
35	Provide hazardous Material Awareness Training for first responders	+	+	+	+	+	+	+	7	High
36	Provide hazardous Materials Operational Level Training for first responders	+	+	+	+	+	+	+	7	High
37	Install a Court House Security System	+	+	+	+	+	+	+	7	High
38	Install Security Systems at all the Nelson county Schools which includes Dakota Prairie (McVille and Petersburg) and Lakota.	+	+	+	+	+	+	+	7	High
39	Replace Lakota Water Treatment Plant	+	+	+	+	+	+	+	7	High
40	Replace Lakota Water Tower	+	+	+	+	+	+	+	7	High
41	Install a generator at the Lakota Community Center	+	+	+	+	+	+	+	7	High
42	Create shelter supply storage at the Lakota Community Center	+	+	+	+	+	+	+	7	High
43	Scope sewer lines and water lines to assess the lines' condition	+	+	+	+	+	+	+	7	High
44	Replace water lines that are identified in dis-repair from scoping project	+	+	+	+	+	+	+	7	High
45	Replace Fire Hydrants	+	+	+	+	+	+	+	7	High
46	Purchase a generator for Tolna's essential services provided by electricity such as shelters, water, and sewer	+	+	+	+	+	+	+	7	High
47	Establish a Tornado Shelter in Pekin City Hall. Assess structural strength and strengthen structure as necessary for a tornado shelter	+	+	+	+	+	+	+	7	High
48	Add a storm shelter to the Stump Lake Park Pavilion to provide protection for the weekend campers and visitors to the Park.	+	+	+	+	+	+	+	7	High
49	Install curb stops and gate valves to prevent basement flooding.	+	+	+	+	+	+	+	7	High
50	Install electrical transfer switch equipment at city community center which is used as a community shelter and emergency operations center.	+	+	+	+	+	+	+	7	High
51	Conduct a Severe Summer Storm Awareness Campaign	+	+	+	+	+	+	+	7	High
52	Aneta streets are deteriorating at a rapid rate due to high water tables, conduct necessary street repairs.	+	+	+	+	+	+	+	7	High
53	Redesign and re-pavement of Main Street to improve drainage and prevent ice buildup.	+	+	+	+	+	+	+	7	High
54	Assess County and Townships for snow bank blockage and determine areas where a living snow fence would be a viable project and plant living snow fences as appropriate.	+	+	+	+	+	+	+	7	High

ID #	Action	Social	Technical	Administrative	Political	Legal	Economic	Environmental	Total	Priority
55	Repair Michigan City streets especially at two railroad crossings.	+	+	+	+	+	+	+	7	High
56	Install water lines and fire hydrants on South Highway 15 and South Main Street for fire control.	+	+	+	+	+	+	+	7	High
57	Conduct an Urban Fire Public Awareness Safety Campaign	+	+	+	+	+	+	+	7	High
58	Repair Water Tower	+	+	+	+	+	+	+	7	High
59	Purchase a vehicle to transport firefighting equipment within the Tolna Fire District and to support mutual aid agreements	+	+	+	+	+	+	+	7	High
60	Install 10-12 Fire Hydrants in Michigan, actual number dependent on final assessment	+	+	+	+	+	+	+	7	High
61	Conduct a Wildland Fire Prevention Awareness Campaign including the meaning of the Fire Danger Index Categories and Controlled Burn procedures.	+	+	+	+	+	+	+	7	High
62	Establish a procedure for activating a burn ban based on the Fire Danger Index	+	+	+	+	+	+	+	7	High
63	Place a Michigan/Whitman Fire Department sub-station at Whitman to include sub-station fire equipment, storm shelter, Emergency command Center, water-sewer-electricity and an electrical generator.	+	+	+	+	+	+	+	7	High
64	Purchase 12 fire suits for fighting wildland fires on CRP land and along railroad tracks.	+	+	+	+	+	+	+	7	High
65	Purchase front end loader (skid steer) for snow removal, cleaning drainage areas, and building a berm to block a hazardous materials spill from water sources.	+	+	+	+	+	+	+	7	High
66	Purchase front end loader (skid steer) for snow removal, cleaning drainage areas, and building a berm to block a hazardous materials spill from water sources.	+	+	+	+	+	+	+	7	High
67	Bury electrical power lines in the City of Lakota (Lakota owns its electrical lines)	+	+	+	+	+	+	+	7	High
68	Review current mutual aid agreements and revise them as necessary	+	+	+	+	+	+	+	7	High
69	Purchase Interoperable Communications Equipment	+	+	+	+	+	+	+	7	High
70	Develop and maintain a special needs population data base.	+	+	+	+	+	+	+	7	High
71	Construct living quarters for hired full-time EMT's to cover Michigan Area Ambulance Territory – 700 Square Miles.	+	+	+	+	+	+	+	7	High

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 Nelson County consists of county government, seven incorporated cities, and 27 townships, each with the potential to create their own land use laws. Currently, the county, and five of the incorporated cities 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 Nelson 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

- Nelson 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	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	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	During updates, add hazard considerations for future land use designations.
Subdivision Regulations	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	Adopt zoning regulations that create disaster resistance such as mobile tie down requirements and floodplain regulations.
Nelson County Emergency Operations Plan	Integrate the operational, response, training, and preparedness needs that are not directly tied to mitigation into the county's emergency operation plan. Use as a resource for Hazard Analysis and Risk Assessment.
Devils Lake/Stump Lake Risk Assessment	Hazard Analysis and Risk Assessment
Enbridge Emergency Response Plan	Hazard Analysis and Risk Assessment, Emergency Response Information
Keystone Pipeline Emergency Information Book	Hazard Analysis and Risk Assessment, Emergency Response Information
Nelson County Terrorism Annex	Hazard Analysis and Risk Assessment
Whitman Dam Emergency Action Plan	Hazard Analysis and Risk Assessment, Emergency Response Information
Tolna Dam Emergency Action Plan	Hazard Analysis and Risk Assessment, Emergency Response Information
Stump Lake Park Master Plan	Hazard Analysis and Risk Assessment, Emergency Response Information
Lakota School Security Plan	Hazard Analysis and Risk Assessment, Emergency Response Information
Dakota Prairie School Emergency Plan	Hazard Analysis and Risk Assessment, Emergency Response Information
Assessment for Stump Lake & Tolna Coulee	Hazard Analysis and Risk Assessment
Devils Lake and Stump Lake Outlet Study	Hazard Analysis and Risk Assessment
Devils Lake Basin Water Management Plan	Hazard Analysis and Risk Assessment
Nelson County NFIP Study	Hazard Analysis and Risk Assessment
Stump Lake Flood Study	Hazard Analysis and Risk Assessment
Nelson County Evacuation/Shelter-in-Place Annex	Hazard Analysis and Risk Assessment, Emergency Response Information
Sheltering & Mass Care Annex	Hazard Analysis and Risk Assessment, Emergency Response Information
Nelson County Wildfire Mitigation Plan	Hazard Analysis and Risk Assessment, Emergency Response Information

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 Nelson 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.	▪ Corporation for National & Community Service
Assistance to Firefighters Grants	Provides funding for fire prevention and safety activities and firefighting equipment.	▪ 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.	▪ US Environmental Protection Agency
Community Development Block Grant (CDBG)	Provides funding for sustainable community development, including disaster mitigation projects.	▪ US Housing and Urban Development
Economic Development Administration (EDA) Grants and Investments	Invests and provides grants for community construction projects, including mitigation activities.	▪ US Economic Development Administration
Emergency Watershed Protection	Provides funding and technical assistance for emergency measures such as floodplain easements in impaired watersheds.	▪ 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.	▪ US Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMA)	Provides pre-disaster flood mitigation funding (with priority	▪ North Dakota State Water Commission

Name	Description	Managing Agencies
	for repetitive flood loss properties under the National Flood Insurance Program).	▪ FEMA – Region VIII
Hazard Mitigation Grant Program (HMGP)	Provides post-disaster mitigation funding.	▪ North Dakota Department of Emergency Services ▪ FEMA – Region VIII
Hazardous Fuels Mitigation Program	Provides funding for the reduction of hazardous wildfire fuels.	▪ US Bureau of Land Management
Homeland Security Grants	Through multiple grants, provides funding for homeland security activities. Some projects can be considered mitigation.	▪ 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.	▪ US Housing and Urban Development
Individual Assistance (IA)	Following a disaster, funds can mitigate hazards when repairing individual and family homes.	▪ North Dakota Department of Emergency Services ▪ FEMA – Region VIII
Law Enforcement Support Office 1033 Program	Provides surplus military property to local law enforcement agencies.	▪ North Dakota National Guard
Map Modernization Program	Provides funding to establish or update floodplain mapping.	▪ North Dakota State Water Commission ▪ FEMA – Region VIII
National Fire Plan (NFP)	Provides funding for pre-disaster wildfire mitigation.	▪ 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.	▪ US Fish and Wildlife Service
North American Wetland Conservation Fund	Provides funding for wetland conservation projects.	▪ US Fish and Wildlife Service
NRCS Conservation Programs	Provides funding through a number of programs for the conservation of natural resources.	▪ 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.	▪ US Fish and Wildlife Service
Pre-Disaster Mitigation (PDM) Grants	Provides grants through a competitive process for specific mitigation projects, including planning.	▪ North Dakota Department of Emergency Services ▪ FEMA – Region VIII

Name	Description	Managing Agencies
Public Assistance (PA)	Following a disaster, funds can be used to mitigate hazards when repairing damages to public structures or infrastructure.	▪ 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.	▪ 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.	▪ US Department of Agriculture, Rural Development
Rural Fire Assistance (RFA) Grant	Funds fire mitigation activities in rural communities.	▪ National Interagency Fire Center
SBA Pre-Disaster Mitigation Loan Program	Provides low-interest loans to small businesses for mitigation projects.	▪ 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.	▪ North Dakota State Water Commission ▪ FEMA – Region VIII
Small Flood Control Projects	Authority of USACE to construct small flood control projects.	▪ US Army Corps of Engineers (USACE)
Streambank & Shoreline Protection	Authority of USACE to construct streambank stabilization projects.	▪ US Army Corps of Engineers (USACE)
Wetland Program Development Grants (WPDGs)	Provides funding for studies related to water pollution prevention.	▪ 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 Nelson County and the incorporated jurisdictions for many years, the plan maintenance responsibilities lie with the Nelson 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 Nelson 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 Nelson 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 Nelson 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 March, 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 Nelson 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 2009 Hazard Mitigation Plan

The 2009 Hazard Mitigation Plan has been used extensively to update and develop other Nelson 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
Nelson County Emergency Operations Center Activation Call List	Planning Committee Members
Nelson County Local Emergency Operations Plan	Hazard Analysis Risk Assessment Planning Committee Members (Functional and Task Coordinators)
Nelson County Public Health Emergency Operations Plan	Hazard Analysis Risk Assessment
Devils Lake/Stump Lake Risk Assessment	Hazard Analysis Risk Assessment
Enbridge Emergency Response Plan	Hazard Analysis

Plans Developed with Information from the 2010 Hazard Mitigation Plan	Information gleaned from the 2010 Hazard Mitigation Plan
	Risk Assessment Emergency Response Information
Whitman Dam Emergency Action Plan	Hazard Analysis Risk Assessment Emergency Response Information
Tolna Dam Emergency Action Plan	Hazard Analysis Risk Assessment Emergency Response Information

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. Nelson 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 city assessor 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 Nelson County Local Emergency Operations Plan 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 Nelson County Plans. Plans that are anticipated to derive information from the 2015 Hazard Mitigation Plan are listed in Table 6.4B below.

Table 6.4B Local Plans Anticipated to be Implemented from the 2015 Hazard Mitigation Plan

Plans Anticipated to be Developed with Information from the 2015 Hazard Mitigation Plan	Information to be gleaned from the 2015 Hazard Mitigation Plan
Nelson County Emergency Operations Center Activation Call List	Planning Committee Members

Plans Anticipated to be Developed with Information from the 2015 Hazard Mitigation Plan	Information to be gleaned from the 2015 Hazard Mitigation Plan
Nelson County Local Emergency Operations Plan	Hazard Analysis Risk Assessment Planning Committee Members (Functional and Task Coordinators)
Nelson County Public Health Emergency Operations Plan	Hazard Analysis Risk Assessment
Keystone Pipeline Emergency Response Information Book	Hazard Analysis Risk Assessment Emergency Response Information
Enbridge Emergency Response Plan	Hazard Analysis Risk Assessment Emergency Response Information
Whitman Dam Emergency Action Plan	Hazard Analysis Risk Assessment Emergency Response Information
Tolna Dam Emergency Action Plan	Hazard Analysis Risk Assessment Emergency Response Information
McVille Dam Emergency Action Plan	Hazard Analysis Risk Assessment Emergency Response Information
Lakota School Security Plan	Hazard Analysis Risk Assessment Emergency Response Information
Dakota Prairie School Emergency Plan	Hazard Analysis Risk Assessment Emergency Response Information
Nelson County Railroad Emergency Plan	Hazard Analysis Risk Assessment Emergency Response Information

6.5 Continued Public Involvement

Nelson 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 Nelson 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 Nelson County Emergency Management Office at:

Nelson County Emergency Management
210 B Ave West
Lakota, ND 58344

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 Nelson 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 Nelson County voiced their opinions on what hazards had affected their lives and their communities.

Appendix A Letters of Intent

NELSON COUNTY EMERGENCY MANAGEMENT AGENCY

210 B Ave W, Ste 302
Lakota, ND 58344

Nelson County Emergency Management would like to inform you of important information regarding Nelson County's Multi Hazard Mitigation Plan (MHMP). FEMA regulations for local governments require that MHMP's be updated and resubmitted to FEMA for approval every five years.

As you are aware, local governments acting as sub-grantees must have a FEMA-approved MHMP in order to apply for and/or receive project grants under the following hazard mitigation assistance programs:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Severe Repetitive Loss (SRL)

Project grants obligated under any of these programs prior to the expiration of a FEMA approved mitigation plan are not affected by this policy, and will continue to be administered under the terms of the grant award. To maintain eligibility for these grants, regulations require that a local government acting as sub-grantee must have an approved MHMP at the time it receives the grants. Therefore, if any MHMPs lapse (i.e., expires before the new or updated plan is approved by FEMA), those jurisdictions will not be eligible for, and FEMA will not award, grant funds for projects under any of the above programs during the lapse. The fact that the local government had a FEMA-approved MHMP when a declaration occurred, or when a PDM, FMA or SRL grant application was submitted, is not sufficient to receive funds after the plan has expired.

Nelson County's Multi Hazard Mitigation Plan expires in 2015 and we will begin our update process soon. This signed letter serves as Nelson County's official intent to participate inthe Hazard Mitigation Plan update and have at least one person be the representative for the county at community risk assessment/planning meetings, not to exceed three (3) meetings.

County of Nelson

Odell Flaagan, Chairman –Nelson Co. Commission	**Sharon G. Young**
Name and Title of County Official	**Nelson County Emergency Manager**
Odell Flaagan	Sharon G. Young
Signature of County Official	**Signature of Emergency Manager**
11-19-13	Nov. 19, 2013
Date	**Date**

NELSON COUNTY EMERGENCY MANAGEMENT AGENCY

210 B Ave W, Ste 302
Lakota, ND 58344

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Please sign and return no later than Monday, November 25, 2013.

City of Michigan

Robbyn Maresh Auditor
Name and Title of City Official

Robbyn B Maresh
Signature of City Official

11-21-13
Date

SHARON YOUNG
Nelson County Emergency Manager

Sharon Young
Signature of Emergency Manager

11-22-13
Date

NELSON COUNTY EMERGENCY MANAGEMENT AGENCY

210 B Ave W, Ste 302
Lakota, ND 58344

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Please sign and return no later than Monday, November 25, 2013.

City of McVille, N.D.

ROBERT STANLEY, MAYOR

Name and Title of City Official

Robert A. Stanley

Signature of City Official

11-22-13

Date

SHARON YOUNG

Nelson County Emergency Manager

Sharon Young

Signature of Emergency Manager

11-25-13

Date

NELSON COUNTY EMERGENCY MANAGEMENT AGENCY

210 B Ave W, Ste 302
Lakota, ND 58344

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Please sign and return no later than Monday, November 25, 2013.

City of Aneta

Todd Whitman Mayor
Name and Title of City Official

Todd Whitman
Signature of City Official

11-20-13
Date

SHARON YOUNG
Nelson County Emergency Manager

Sharon Young
Signature of Emergency Manager

11-22-13
Date

NELSON COUNTY EMERGENCY MANAGEMENT AGENCY

210 B Ave W, Ste 302
Lakota, ND 58344

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Please sign and return no later than Monday, November 25, 2013.

City of Lakota

Amie Yasichek, Auditor
Name and Title of City Official

Signature of City Official

11/19/13
Date

SHARON YOUNG
Nelson County Emergency Manager

Sharon Young
Signature of Emergency Manager

11-22-13
Date

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210 B Ave W, Ste 302
Lakota, ND 58344

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Please sign and return no later than Monday, November 25, 2013.

City of Pekin

Mayor Steve Giroday
Name and Title of City Official

Steve Giroday
Signature of City Official

11-22-13
Date

SHARON YOUNG
Nelson County Emergency Manager

Sharon Young
Signature of Emergency Manager

11-25-13
Date

NELSON COUNTY EMERGENCY MANAGEMENT AGENCY

210 B Ave W, Ste 302
Lakota, ND 58344

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Please sign and return no later than Monday, November 25, 2013.

City of Petersburg

Mayor Mike Schmidt
Name and Title of City Official

[signature]
Signature of City Official

11-21-2013
Date

SHARON YOUNG
Nelson County Emergency Manager

Sharon Young
Signature of Emergency Manager

11-22-13
Date

NELSON COUNTY EMERGENCY MANAGEMENT AGENCY

210 B Ave W, Ste 302
Lakota, ND 58344

Nelson County Emergency Management would like to inform you of important information regarding Nelson County's Multi Hazard Mitigation Plan (MHMP). FEMA regulations for local governments require that MHMP's be updated and resubmitted to FEMA for approval every five years.

As you are aware, local governments acting as sub-grantees must have a FEMA-approved MHMP in order to apply for and/or receive project grants under the following hazard mitigation assistance programs:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Severe Repetitive Loss (SRL)

Project grants obligated under any of these programs prior to the expiration of a FEMA approved mitigation plan are not affected by this policy, and will continue to be administered under the terms of the grant award. To maintain eligibility for these grants, regulations require that a local government acting as sub-grantee must have an approved MHMP at the time it receives the grants. Therefore, if any MHMPs lapse (i.e., expires before the new or updated plan is approved by FEMA), those jurisdictions will not be eligible for, and FEMA will not award, grant funds for projects under any of the above programs during the lapse. The fact that the local government had a FEMA-approved MHMP when a declaration occurred, or when a PDM, FMA or SRL grant application was submitted, is not sufficient to receive funds after the plan has expired.

Nelson County's Multi Hazard Mitigation Plan expires in 2015 and we will begin our update process soon. This signed letter serves as the cities official intent to participate in the Hazard Mitigation Plan update and have at least one person be the representative for the city at community planning meetings.

Please sign and return no later than Monday, November 25, 2013.

City of Tolna

Vicky Engen Auditor
Name and Title of City Official

Vicky Engen
Signature of City Official

11/19/13
Date

SHARON YOUNG
Nelson County Emergency Manager

Sharon Young
Signature of Emergency Manager

11-22-13
Date

Appendix B, Multi-Hazard Mitigation Plan Planning Meetings

Multi-Hazard Mitigation Plan Planning Meeting Notifications

(E-mails, Newspaper Articles, Courthouse Bulletin Board, Facebook notices, County Website Postings)

From: Ken L. Jarolimek [mailto:kjarolimek@wenck.com]
Sent: Thursday, June 12, 2014 1:26 PM
To: syoung@nd.gov
Subject: Kick off meeting invite

Sharon, here is a sample letter, feel free to revise as you see fit. It is important you keep copies of the letters as they will have to be included as an appendix to the plan. Also attached is a sample news release. We have to keep copies of these also to include in the plan. The public has to be invited to each meeting and that can be done through the news releases or other types of public announcements.

One thing you will have to decide is where to hold the meetings. Are you going to hold them all in Lakota or in different county cities? That decision can be made later by you or the committee can decide at the "Kick-Off" Meeting.

I am looking forward to working with you and Nelson County.

Ken

Kenneth Jarolimek – Consultant – Safety and Emergency Preparedness

Wenck Associates Inc., 301-1st Street NE, #202, Mandan, ND 58554-3370

www.wenck.com | kjarolimek@wenck.com| D 701.751.6135 | F 701.751.3372 | C 701-426-9449 |

June xx, 2014

Dear ……

Nelson County is beginning the process of revising its Multi-Hazard Mitigation Plan which expires in 2015. The first step in the process is to form a Multi-Hazard Mitigation Planning Committee. It is important Lakota be represented on this Committee so Lakota can be eligible for mitigation grants. I am asking you to appoint a city representative as stated in the Memorandum of Agreement you signed in November. The representative of Lakota will be asked to participate in three to four meetings over the next 10-12 months.

The planning process will begin with a "Kick-Off" Meeting set for 7:00 P.M., July xxx, 2014 at the Farmer's Room of the Nelson County Courthouse. The purpose of the meeting is to organize the Nelson County Hazard Mitigation Planning Team, review the planning activities, and basically lay the ground work for a successful hazard mitigation planning process.

Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risk from hazards. Nelson County's Hazard Mitigation Plan is expiring soon; therefore updating the plan is an important undertaking for Nelson County and its communities.

Wenck Associates is contracted with Nelson County to complete the Hazard Mitigation Plan. Wenck representatives will be on hand to assist with the meeting.

The meeting agenda will include reviewing Nelson County's disaster history, defining hazard mitigation, a brief overview of the expired hazard mitigation plan, a review of the planning timeline, identifying the planning team, and setting the planning process that will work for the planning committee.

If you have any questions, please contact me at the Nelson County Courthouse or call me at 701-247-2472.

Sincerely,

Sharon Young, Nelson County Emergency Manager

On Jun 19, 2014, at 1:23 PM, "Sharon Young" <syoung@nd.gov> wrote:

Ken,

Would Wednesday, July 30 at 7:00pm work for you for the Kickoff mtg? I would hold it here in the courthouse in Lakota.

Sharon Young

From: Ken L. Jarolimek [mailto:kjarolimek@wenck.com]
Sent: Thursday, June 19, 2014 7:42 PM
To: Sharon Young
Subject: Re: Kick off meeting date

That should work.
Sent from my iPhone

Fri 6/20/2014 9:34 AM

OK I will get that date & time on the calendar here at the courthouse & reserve our Community Room. I plan to get letters out next week about the Kickoff meeting. All of our city councils meet the first Monday of the month, except for one that meets the first Wednesday, which gives them plenty of time

before the kickoff meeting to select their attendees and for me to do follow-up/reminder notifications prior to the meeting.

Let me know if you need anything for the meeting, and we will stay in touch. Thanks!

Sharon

Thu 7/17/2014 10:47 AM

Ken - Attached are the Kick-Off mtg invites letters that I sent out to the Cities, LEPC, Water Resource District, Township Officers Assn, your Kick-Off Meeting invite & New Release templates, and your original email (below). I decided to attach my news release as well. Let me know if you need anything else. Thanks for calling today!

Sharon Young

June 24, 2014

City of Aneta,

Nelson County is beginning the process of revising its Multi-Hazard Mitigation Plan (MHMP) which expires in 2015. The first step in the process is to form a Multi-Hazard Mitigation Planning Committee. It is important Aneta be represented on this Committee so Aneta can be eligible for mitigation grants. I am asking you to appoint a city representative as stated in the enclosed Memorandum of Agreement you signed in November. The representative of Aneta will be asked to participate in three to four meetings over the next 10-12 months.

The planning process will begin with a "Kick-Off" Meeting set for **7:00 P.M., Wednesday July 30, 2014 at the Community Room of the Nelson County Courthouse**. The purpose of the meeting is to organize the Nelson County Hazard Mitigation Planning Team, review the planning activities, and basically lay the ground work for a successful hazard mitigation planning process. You may send more than one representative to the meeting.

Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risk from hazards (flood protection projects, early warning sirens, generators, relocations, acquisitions, etc.). Nelson County's Hazard Mitigation Plan is expiring soon; therefore updating the plan is an important undertaking for Nelson County and its communities.

Nelson County was awarded FEMA grant funding to complete the plan update. Wenck Associates is contracted with Nelson County to complete the Hazard Mitigation Plan. Wenck representatives will be on hand to assist with the meeting.

The meeting agenda will include reviewing Nelson County's disaster history, defining hazard mitigation, a brief overview of the expired hazard mitigation plan, a review of the planning timeline, identifying the planning team, and setting the planning process that will work for the planning committee.

If you have any questions, please contact me at the Nelson County Courthouse or call me at 701-247-2472.

Sincerely,

Sharon Young,

Nelson County Emergency Manager

June 24, 2014

City of McVille,

Nelson County is beginning the process of revising its Multi-Hazard Mitigation Plan (MHMP) which expires in 2015. The first step in the process is to form a Multi-Hazard Mitigation Planning Committee. It is important McVille be represented on this Committee so McVille can be eligible for mitigation grants. I am asking you to appoint a city representative as stated in the enclosed Memorandum of Agreement you signed in November. The representative of McVille will be asked to participate in three to four meetings over the next 10-12 months.

The planning process will begin with a "Kick-Off" Meeting set for **7:00 P.M., Wednesday July 30, 2014 at the Community Room of the Nelson County Courthouse**. The purpose of the meeting is to organize the Nelson County Hazard Mitigation Planning Team, review the planning activities, and basically lay the ground work for a successful hazard mitigation planning process. You may send more than one representative to the meeting.

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Sincerely,

Sharon Young,

Nelson County Emergency Manager

June 24, 2014

City of Lakota,

Nelson County is beginning the process of revising its Multi-Hazard Mitigation Plan (MHMP) which expires in 2015. The first step in the process is to form a Multi-Hazard Mitigation Planning Committee. It is important Lakota be represented on this Committee so Lakota can be eligible for mitigation grants. I am asking you to appoint a city representative as stated in the enclosed Memorandum of Agreement you signed in November. The representative of Lakota will be asked to participate in three to four meetings over the next 10-12 months.

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If you have any questions, please contact me at the Nelson County Courthouse or call me at 701-247-2472.

Sincerely,

Sharon Young,

Nelson County Emergency Manager

June 24, 2014

City of Michigan,

Nelson County is beginning the process of revising its Multi-Hazard Mitigation Plan (MHMP) which expires in 2015. The first step in the process is to form a Multi-Hazard Mitigation Planning Committee. It is important Michigan be represented on this Committee so Michigan can be eligible for mitigation grants. I am asking you to appoint a city representative as stated in the enclosed Memorandum of Agreement you signed in November. The representative of Michigan will be asked to participate in three to four meetings over the next 10-12 months.

The planning process will begin with a "Kick-Off" Meeting set for **7:00 P.M., Wednesday July 30, 2014 at the Community Room of the Nelson County Courthouse**. The purpose of the meeting is to organize the Nelson County Hazard Mitigation Planning Team, review the planning activities, and basically lay the ground work for a successful hazard mitigation planning process. You may send more than one representative to the meeting.

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If you have any questions, please contact me at the Nelson County Courthouse or call me at 701-247-2472.

Sincerely,

Sharon Young,

Nelson County Emergency Manager

News Release

For Immediate Release

July xxx, 2014

Sharon Young the Nelson County Emergency Manager is inviting Nelson County residents to participate in the Nelson County Hazard Mitigation Plan "Kick-Off Meeting". The meeting will be held July xxx at 7:00 PM at the Nelson County Courthouse. The purpose of the meeting is to organize the Nelson County Hazard Mitigation Planning Team, review the planning activities, and basically lay the ground work for a successful hazard mitigation planning process.

"An important part of emergency preparedness is Hazard Mitigation planning", according to Sharon Young. "Citizens see what happens during various events such as flooding, rural fires, tornadoes, hazardous materials spills and other events, therefore it is important we have a broad range of participation for good input at this meeting", added Sharon.

Through the hazard mitigation planning process, Nelson County and its communities can identify hazard mitigation measures. Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risks from hazards.

For more information or to get answers to questions, please contact Sharon Young at the Nelson County Courthouse at 701-247-2472.

-End-

County Website Advertising Kick-Off Meeting

Facebook Page Advertising Kick-Off Meeting

Facebook - Internet Explorer

https://www.facebook.com/

File Edit View Favorites Tools Help

NOAA-Devils Lake | NWS Grand Forks | NWS Partner Quick Brief | Welcome to Facebook - Log ... | FCC Universal Licensing Syst... | License Search - Geographic... | USGS - Devils Lake Basin Data

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Paulette Haugen, Stacy Jallo Baker, Ellen Hamre Ringdahl and 22 others like this.

Write a comment...

Nelson County Emergency Management
1 min

Nelson County residents are invited to participate in the Nelson County Hazard Mitigation Plan "Kick-Off Meeting". The meeting will be held Wednesday, July 30 at 7:00 PM at the Nelson County Courthouse Community Room. The purpose of the meeting is to organize the Nelson County Hazard Mitigation Planning Team, review the planning activities, and basically lay the ground work for a successful hazard mitigation planning process.

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Carol Joy Brandvold likes Judy Galde's link.
Mike Tami Stein likes Lorie F Schlechter Dinger's link.

Jill Kunz Mobile
Jerilyn Wass Mobile
Alicia Sinclair Mobile
Helen Moen Web
Roxanne Gardner Mobile
Shannon Baker Mobile
Sarah Steffan Mat... Web
Angel Hanssen S... 11m
Jayme Tenneson 2m
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Carol Joy Brandvold Web
Nels Peterson

MORE FRIENDS (12)
Caroline Kelland H... 3m

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C4 www.GrandForksHerald.com REGION Grand Forks Herald, Sunday, July 20, 2014

REGIONAL ROUNDUP

Hallock canola plant to expand

The Northstar Agri Industries canola processing plant in Hallock, Minn., is planning to increase production by 40 percent, add storage capacity and hire a few more workers, according to the Kittson County Enterprise.

The newspaper said Wednesday that plant manager Matt Kuzel is worried about where new workers will live. Current workers are already "widely dispersed" and driving long distances to the plant, he said. The expansion project will require housing for about 150, he said.

Feedlot irks some in Norman County

The Sundal Township board in Norman County has voted on a 12-month moratorium on feedlots after residents expressed concerns over a proposed new feedlot, according to the Fertile Journal.

The newspaper said Wednesday that Protein Sources is interested in building two buildings each the size of a football field to house 2,400 sows producing 2,600 piglets a week.

At a meeting last month, resident Margaret Cuellar wondered if laws on the book offer enough protection.

Several other townships have also discussed moratoriums, including Spring Creek, Strand and Waukon.

significantly this year compared to the same period a year ago, according to the Walsh County Record.

The newspaper said Wednesday that revenue was up 322 percent to $25,300. Rain and flooding last year dampened the financials, but even compared to 2012, revenues were still up 67 percent.

Grafton parks director Bill Dahl said there are also more campsites to rent.

Park River schools priorities decided

Consultants have told the Park River Area School District that its top priorities should include increasing programming and staffing, adding more space and improving security, according to the Walsh County Press.

The newspaper said Wednesday that Superintendent Kirk Ham said many issues brought up by FJJ Solutions as part of a state-mandated planning process had come up earlier in other discussions.

FJJ said the district lacks an art curriculum, tech coordinator, elementary councilor and space in the elementary school. Entrances are also not secure and there are safety concerns in the area where children are picked up and dropped off.

Kittson memorial moving along

Kittson County is getting

Highway 59 in Lake Bronson. The memorial will include the U.S., state and POW/MIA flags and four black granite monuments inscribed with the names of service members killed while on duty.

The memorial committee continues to raise funds for the project, including selling paving stones at a cost of $50, $100 and $150, depending on size.

Nelson Co. seeks hazard plan input

Nelson County is asking residents for help with its hazard mitigation plan, according to the Lakota American.

The newspaper said Wednesday that county Emergency Management is inviting residents to a public meeting at 7 p.m. July 30 at the Nelson County Courthouse in Lakota, N.D.

Emergency Manager Sharon Young said residents see the effects of flooding, rural fires, tornadoes and hazardous material spills and would be able to offer good input.

Crookston dean-to-be resigns

Crookston High School Activities Director Don Donarski, who was expected to become full-time dean of students, is resigning, according to the Crookston Daily Times.

The newspaper said Tuesday the dean position hasn't been full time since it was eliminated by budget

The view from Page One

Callahan Spoonland, 5, struggles to pedal in the Kid's Tractor Pull on Saturday in Hoople, N.D., as part of the 125th anniversary celebration weekend marking the year Hoople was founded. (Luke Franke/Grand Forks Herald)

Area News

Woman accused of taking son arrested in Ohio

A Minnesota woman suspected of taking her son in violation of a court order has been arrested in Ohio.

The Kandiyohi County Sheriff's Office reported that Amy Lorraine Winterfeldt, 44, was arrested late Friday by the Ohio State Patrol.

Winterfeldt

The sheriff's office in west-central Minnesota had issued an alert for Winterfeldt last week, saying she was supposed to bring her 4-year-old son, Alex Gomm, to his father in Appleton, Wis., on July 12 but didn't show up.

The child, also known as Alex Winterfeldt, had been entered in the missing children database by Appleton police, and an arrest warrant was issued for his mother. The patrol arrested Winterfeldt after pulling her over for a vehicle equipment violation, the sheriff's office said.

Three minors in the vehi-

juries to her head and took her to Trinity Hospital in Minot, KXMC reported.

Officials quoted by the station said it was unclear whether the seat malfunctioned or whether the woman may have hit her head on the side bars.

The ride was closed temporarily while a safety inspection was performed.

Historic stone pavilion damaged

DULUTH — The historic stone pavilion in Duluth's Lincoln Park was damaged by a fire early Saturday, and officials say it's a case of arson.

The Duluth Fire Department reported that crews were called to the park just after midnight on a report of a portable toilet on fire. Soon after, the call was upgraded on reports that the fire was spreading to the roof of the adjacent stone pavilion.

Crews extinguished the fire, and most of the damage — estimated at $75,000 — is on the east end of the roof structure, fire officials said. No injuries were reported.

The Duluth Fire Marshal's Office has determined the cause of the fire to be incendiary, and officials are investigating it as a case of arson.

The pavilion was built in the 1930s by the federal Works Progress Adminis-

vehicle and then airlifted to a Duluth hospital with what officials said were non-life-threatening injuries.

The suspect, a 46-year-old White Township man, was located a short time later near the crime scene and was apprehended by the sheriff's office K-9 unit after fleeing on foot. He was treated for minor injuries and then taken to the county jail.

The names of the victim and suspect have not yet been released.

Off-duty officer helps boaters

BAYFIELD, Wis. — An off-duty U.S. Coast Guard officer and a Coast Guard Auxiliary member helped treat two people injured in a boating accident Friday night on Lake Superior near Madeline Island.

The Coast Guard said it was contacted by the Bayfield Fire Department at about 8 p.m. Friday regarding the accident, in which a 24-foot boat suffered a steering malfunction that caused a sudden turn.

Two of the three passengers — a 5-year-old boy and his grandmother — suffered injuries, authorities said, and the boat was reported adrift offshore from La Pointe on Madeline Island.

Off-duty Petty Officer 2nd Class Justin Harris, who was boating nearby with his family, and Coast Guard

Thu 7/31/2014 3:11 PM

Vicky Engen <engen5@stellarnet.com>; McVille City Office <mcvillend@gondtc.com>; Duane Avdem <dandkavdem@stellarnet.com>; Lauri Rysavy <frysavy@polarcomm.com>; Robbyn Maresh <robbyncity@polarcomm.com>; City of Pekin <cityofpekin@gondtc.com>; Doug Stein <dstein@gondtc.com>; Ed Pawlikowski <eddyp@polarcomm.com>; Amie Vasichek <lakotact@polarcomm.com>; Milton Schmidt <mhs@polarcomm.com>; James Schmidt <jamesschmidt@nd.gov>; Jaima Curry curryjaima@gmail.com

Thank you to those of you that participated in the Multi-Hazard Mitigation Planning kick-off meeting last night!

The next meeting will be **Wednesday, September 17, 2014 at 7:00pm** in the Nelson County Courthouse Community Room, Lakota. Please add this to your calendars and share with any other Planning Team representatives from your city.

Copies of city council meeting minutes that document your participation in the planning process need to be included in the updated Hazard Mitigation plan. Please send me copies of any minutes where the

Kick-Off meeting or selecting your city representative(s) etc are noted. Or, let me know that the minutes have been posted on your city website and I can print them out myself.

Lastly, **attached is the Hazard Mitigation Questionnaire** from last night's meeting. This electronic version may be helpful in obtaining more hazard mitigation input from your city council members or community members. Please send any completed surveys to me by Wednesday, September 10 so that I can submit them to Ken (my contractor) before the next meeting. I will eventually be putting the questionnaire out to the public via the county website, my emergency management Facebook page, and through an article in the county newspapers.

Thanks,

Sharon Young

Hazard Mitigation Questionnaire

(Note: 11 Responses were received and are compiled in this document)

Completed by: _____

Agency/Jurisdiction: _____

Title: _____

Date: _____

1. What mitigation work has been done in your jurisdiction since 2010? (See question 10.)
   - *Nothing (6)*
   - *Generators for Water Tower, Lift Station, Fire and Community Center. (3)*
   - *New Siren Warning System.*
   - *Minor site changes concerned with reviewers at time of incident review.*
2. Has your jurisdiction used the existing mitigation plan? If so, how? If not, what could be done to make the plan more useful?
   - *No (9)*
   - *Hazardous Occurrences*
   - *Revisit plan for actual follow up of where our agency could comprise.*
3. What tools or regulations does your jurisdiction currently use to mitigate the risk to development? (building codes, zoning, etc.)
   - *No (7)*
   - *Building Codes (2)*
   - *Ordinances, Grass Mower, Building Condemnation*
   - *NRCS, USAC, State Water Comission, Century Code Rule and Regs for our operation, power and Duties*

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?
   - *No (10)*
   - *Minor Inclusions*
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?
   - *No (10)*
   - *Natural Water Course sudden blockage due to large storm events.*

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. **Only top 3 Hazards shown here*

Communicable Disease (including human, animal, and plant diseases) **(1)**

Dam Failure **(3)**

Drought

Flood (including riverine, ice jam, and flash floods) **(2,3,1)**

Hazardous Material Release **(3,2,3)**

Homeland Security Incident

Shortage or Outage of Critical Materials or Infrastructure (including power outages and gas shortages) **(3,1,1,2)**

Summer Storm (including tornadoes, hail, downbursts, lightning, and strong winds) **(2,1,2,2,3,2,2)**

Transportation Accident (including vehicular, railway, and aircraft accidents)

Urban Fire or Structure Collapse

Wildland Fire **(3,3)**

Winter Weather (including blizzards, heavy snow, ice storms, and extreme cold) **(1,1,2,1,2,2,2,1,1)**

7. Have any major disasters occurred in your jurisdiction since 2010? If so, what were the losses (type and dollar amount?)
   - *No (10)*
   - *Floods, Spring and summer large storm events $20-40,000 impacts.*

8. 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?
   - *Nothing (6)*
   - *Preparation for Winter Weather and Tornadoes/Set up Instructions (2)*
   - *Shelter with Generators*
   - *Building Codes/Zoning and Ordinances*

9. What mitigation goals do you have for your community? Goals are broad, visionary statements.
   - *Nothing (7)*
   - *Storm Water Management (2)*
   - *Building Codes and Management*
   - *Better Public Knowledge*
   - *Wild Animal Control (Deer, Coyote)*
   - *New Asphalt man street, with storm sewers*
   - *Get regional waterways maintenance underwear to protect roadways, yards, and infrastructure.*

10. 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*
- *Floodproofing*
- *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)?

- *Nothing (4)*
- *Situational Awareness, Warning Systems, Window Safety Film, Backup Power*
- *Blizzard & Tornado*
- *Tornado Safe Rooms (Lots of Campers North of Town)*
- *Storm Water Management*
- *Bank 5 Radio System (Sheyenne River Reach)*
- *Flood Control (Flood Damage Reduction Projects)*

11. What other mitigation projects would you like to see done in your community?
    - *Nothing(7)*
    - *Back Up Power in city building (2)*

- *New Water and Sewer Pipelines through town for all homes.*
- *Sheet Water Drainage System*

Tue 8/12/2014 9:42 AM

Ken,

Here are maps of the route of the proposed Enbridge Sandpiper Pipeline through Nelson County, as well as a map of the proposed pumping station location. Like you said, at some point we will need to decide if we include this in the updated plan or not. I suppose it could go in just as it is…..a proposed project? I will have to rely on your expertise on what is best to do.

Anyway, here are the maps. I've sent the Nelson County map in a jpg file as well as a document file. The pumping station is on page 16 of the State ND Notice Maps attachment. Pages 17 & 18 include the route in Nelson County.

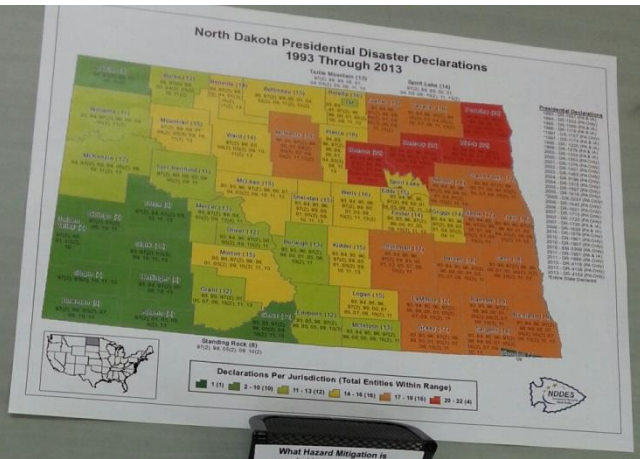
Sharon Young

Wed 8/20/2014 2:54 PM

Hi, Ken – Attached are the various methods I have used to get public input on mitigation ideas (Facebook, county website, newspaper, questionnaires on both my & the auditor's office counters) . I'm trying to keep up with sending you things you mentioned are needed in the plan for FEMA!

Thanks,

Sharon Young



What Hazard Mitigation is needed in Nelson County?

Please take a questionnaire, complete & return by Sept 10.

(Please return by **September 10** to Sharon Young, Nelson Co. Emergency Mgr – syoung@nd.gov or fax 701-247-2167 or mail 210 B Ave W, Ste 302, Lakota, ND 58344)

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?

NEWS RELEASE

For Immediate Release
August 11, 2014

Contact: Sharon Young,
Nelson County Emergency Manager
701-247-2472 (work)
701-270-0681 (cell)

Public Input Needed for Nelson County Multi-Hazard Mitigation Plan Update

Nelson County is in the process of updating its Multi-Hazard Mitigation Plan. Hazard Mitigation is the completion of projects to reduce or eliminate the damage that hazards such as flooding & severe storms cause.

One of the steps in plan development is the gathering of information from the public regarding hazard mitigation. The public is very knowledgeable about what goes on in the Nelson County cities and townships. The public sees the effects of various hazards, and often has great ideas on how to limit or even prevent the damage the hazard causes.

Nelson County Emergency Management is asking the public to complete a Hazard Mitigation Questionnaire. The questionnaire can be found at www.nelsonco.org. Copies are also available at the Nelson County Courthouse in Lakota in the office of the Emergency Manager. You may also request a copy by calling Sharon Young at 247-2472 and one will be mailed to you. If you would like a copy emailed to you, please request one at syoung@nd.gov

Residents are asked to complete the survey by September 10, and submit to Sharon Young, Nelson County Emergency Manager via email at syoung@nd.gov, or fax 701-247-2167, or mail 210 B Ave W, Ste 302, Lakota, ND 58344.

-###-

Thu 8/28/2014 12:05 PM

Hi, Ken –

Would you please send me whatever you have in mind for the next Mitigation Planning meeting on Sept 17th (purpose, what we are going to do, agenda etc) if you have that? I am thinking I should send out a reminder notice by tomorrow at least to the cities so they get it before the September city council meetings. I am assuming that all the cities that typically meet on the first Monday of the month will either meet Tuesday or wait till the second Monday of the month due to the Labor Day holiday.

I will also eventually send out a reminder notice to all that attended the first mtg (I sent an initial save-the-date type notice earlier), but am thinking about my cities first.

Thanks,

Sharon Young

Thursday, August 28, 2014 12:15 PM
To: Sharon Young
Subject: RE: Next Meeting - notice/agenda info

We are going to review these Sections of the plan. I will have them drafted and we will go over them with the committee. To be honest my research will need some correction from the committee members and there may be some items they will want to add or take away.

1. Introduction

1.1. Purpose

1.2. Scope and Organization

1.3. Authorities

1.4. County and Jurisdictional Overview

1.5. County History

1.6. Summary of Hazards

2. Planning Process and Methodologies

2.1. Planning Steps

2.2. Initial Planning Process

2.3. Plan Update Process

2.4. Roles and Responsibilities

2.5. Risk Assessment Methodologies

2.6. Hazard Identification

3. Assets at Risk

3.1. Critical Facilities and Infrastructure

3.2. Population and Structure

3.3. Economic, Ecologic, Historic, and Social Values

3.4. Current Land Use

3.5. New Development

3.6. Future Development

KJarolimek

Thu 9/11/2014 9:11 AM

Hi, Ken – I will try to get you this by tomorrow. I have a school meeting today.

I have gotten 11 questionnaires/surveys turned in to me. Would you like those before the meeting next week, or should I give them to you then?

And lastly, does next week's meeting need to advertised in any way for the public? I don't remember you telling me that it did so I have not yet. I could get it into the Lakota American but it would come out the day of the mtg. I have sent notices and reminders to all the cities and other members of the Planning Team.

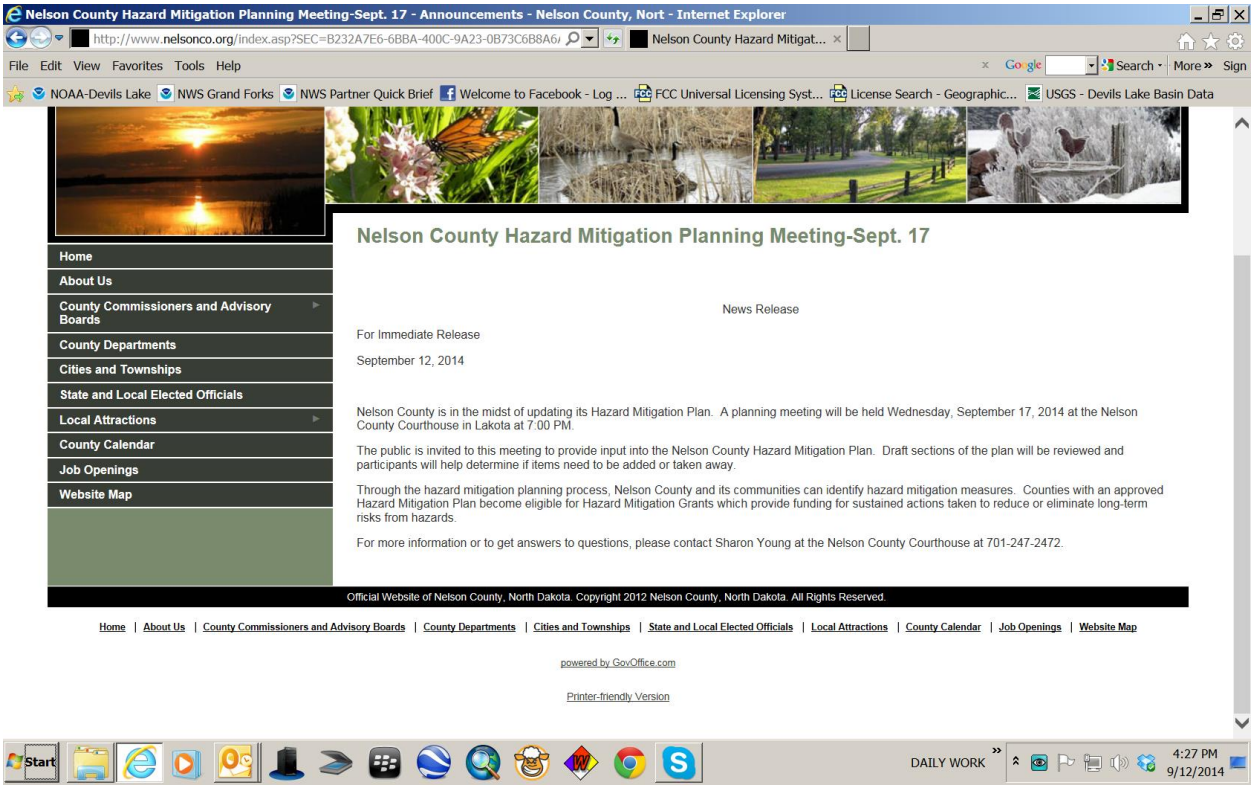
Sharon

Wed 9/17/2014 11:20 AM

Attached are the Sept. 17th meeting notifications we posted on Facebook, our County Website, and in the Lakota American. Sending for your inclusion in the plan (I assume they are needed as evidence the public was invited/notified).

Sharon Young

County Website Planning meeting notice



Nelson County Hazard Mitigation Planning Meeting-Sept. 17 - Announcements - Nelson County, Nort - Internet Explorer

http://www.nelsonco.org/index.asp?SEC=B232A7E6-6BBA-400C-9A23-0B73C6B8A6

File Edit View Favorites Tools Help

NOAA-Devils Lake | NWS Grand Forks | NWS Partner Quick Brief | Welcome to Facebook - Log ... | FCC Universal Licensing Syst... | License Search - Geographic... | USGS - Devils Lake Basin Data

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Cities and Townships
State and Local Elected Officials
Local Attractions
County Calendar
Job Openings
Website Map

Nelson County Hazard Mitigation Planning Meeting-Sept. 17

News Release

For Immediate Release

September 12, 2014

Nelson County is in the midst of updating its Hazard Mitigation Plan. A planning meeting will be held Wednesday, September 17, 2014 at the Nelson County Courthouse in Lakota at 7:00 PM.

The public is invited to this meeting to provide input into the Nelson County Hazard Mitigation Plan. Draft sections of the plan will be reviewed and participants will help determine if items need to be added or taken away.

Through the hazard mitigation planning process, Nelson County and its communities can identify hazard mitigation measures. Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risks from hazards.

For more information or to get answers to questions, please contact Sharon Young at the Nelson County Courthouse at 701-247-2472.

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Start DAILY WORK 4:27 PM 9/12/2014

Facebook Planning Meeting Advertisement

Nelson Co. Hazard Mitigation Planning Meeting
09.17.14 – 7:00 PM

Present: Herb Schultz, Jaima Curry (LEPC), Vicky Engen, Ron Miller (LEPC), Keith Olson (LEPC), Ed Pawlikowski, Amie Vasichek, Todd Whitman, Janet Tweed (LEPC), Bruce Ellertson, Sharon Young (Nelson Co. Emergency Manager), Joanne Brennan, Tim Lee (LEPC), Mark Opoien (LEPC).

Nelson Co. Emergency Manager Sharon Young opened the meeting and then turned it over to Ken Jarolimek of Wenck Associates, Inc. Mr. Jarolimek is the consultant hired to facilitate the plan update.

The focus of tonight's meeting was to review draft sections of the 2015 Multi-Hazard Mitigation Plan.

The planning team reviewed the *Executive Summ*ary, reviewed & revised the *Nelson County Hazard Prioritizatio*ns, and outlined six goals for the mitigation strategy.

Next the group reviewed the first three draft sections of the plan: *Introduction, Planning Process & Methodologies, and Assets at Risk.* Handouts of these sections were provided to all

attendees. The planning team's input was used to make corrections, additions, and revisions to each section.

The next planning meeting will be Wednesday, November 12, 2014 at 7:00pm in the Nelson County Courthouse Community Room in Lakota. The planning team will be conducting a Risk Assessment during this meeting.

Respectfully submitted,

Sharon Young,
Nelson County Emergency Manager

From: Sharon Young [mailto:syoung@nd.gov]
Sent: Monday, October 27, 2014 10:34 AM
To: Ken L. Jarolimek
Subject: RE: Guidance for Developing Specific Mitigation Actions

Ken, just a couple of things:

Do you have an agenda and/or informational note that I can send out to the cities about the next meeting (Nov. 12)? Most of the cities meet again on Monday, Nov. 3 so I think a reminder notice to them this week would be good, and so they know this meeting is an important one & why etc. I can send something out to the other members of the planning team about a week before the meeting to remind them as well.

Any thoughts on my Oct. 1 email about Land Use Maps? Do you need Skip to create these for you?

I think you said my Critical Facilities/Infrastructure maps were complete as is, but if you have had a chance to look at them and think they need something added…..please let me know. Then I will ask KLJ to get me a list of the Critical Facilities. Do you need just the name of the facility, address, city and category of the facility for that list?

Sharon

From: Ken L. Jarolimek [mailto:kjarolimek@wenck.com]
Sent: Monday, October 27, 2014 12:57 PM
To: Sharon Young
Subject: RE: Guidance for Developing Specific Mitigation Actions

I will not have a written agenda for this meeting. What we are going to do is a quick review of the updates for Sections 1-3 and then get into Section 4 which is the Hazard Analysis. I have a draft copy of Section 4 that needs to be reviewed by the committee. It is too long to go through it in a meeting with everyone participating so what I plan to do is break the meeting participants up into small groups and have each group review the various hazards such as flood, wind, severe summer weather, severe

winter weather, hazardous materials, etc. then report out to the whole group any changes they want to see in that hazard section. This will work real well in that the committee members become engaged. I will try to get each member into a group that interests them such as having the highway superintendent in the "transportation" section group. So if you want some words to say you can say something like this. **"The Multi-Hazard Mitigation Planning meeting will be held on November 12 at 7:00 PM in the Nelson County Courthouse. The meeting agenda is to develop the Hazard Analysis for Nelson County which is a major part of the Multi-Hazard Mitigation Plan. It is from this Hazard Analysis that Mitigation Projects will be developed."**

As far as the land use maps, I thought you might have something locally available, if not our GIS staff member can develop them. There is no need to hire another firm.

I think your Critical Facilities maps are good. Yes, I will need the facility name, address, city, and category. You might have that in your LEOP.

Looking forward to seeing you. KJarolimek

Mon 10/27/2014 2:10 PM

Sharon

As always, great information and answers! Thanks so much. Sounds like it will be an interesting meeting. If I have further questions……you know I will ask!

Take care,

Sharon

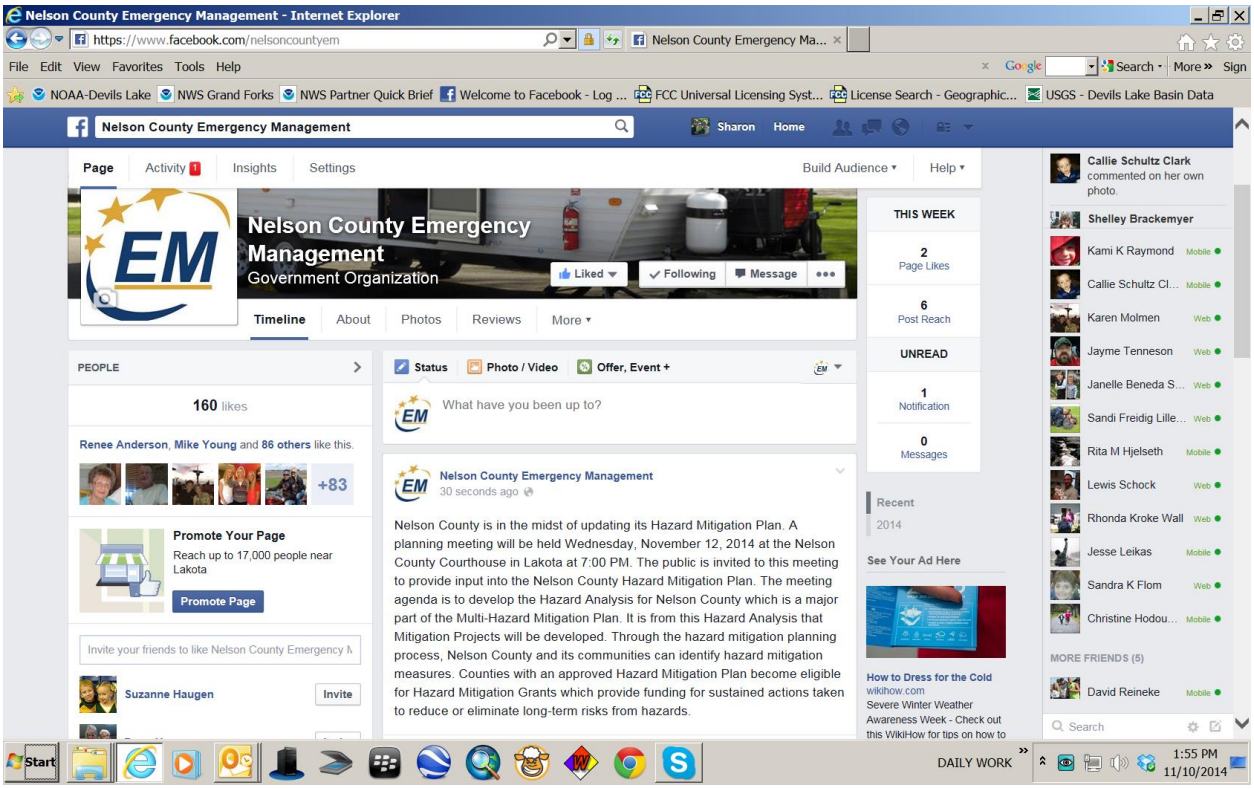
Mon 11/10/2014 2:23 PM

Attached are the Nov. 12th meeting notifications we posted on Facebook, in the Lakota American, & in the Ness Press publications (Michigan-Nelson Co Arena, McVille Messenger, Aneta Star).

Thanks,

Sharon

Sharon Young


Nelson County Emergency Management - Internet Explorer
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File Edit View Favorites Tools Help
NOAA-Devils Lake
NWS Grand Forks
NWS Partner Quick Brief
Welcome to Facebook - Log ...
FCC Universal Licensing Syst...
License Search - Geographic...
USGS - Devils Lake Basin Data
Nelson County Emergency Management
Sharon
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Renee Anderson, Mike Young and 86 others like this.
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Nelson County Emergency Management
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Nelson County is in the midst of updating its Hazard Mitigation Plan. A planning meeting will be held Wednesday, November 12, 2014 at the Nelson County Courthouse in Lakota at 7:00 PM. The public is invited to this meeting to provide input into the Nelson County Hazard Mitigation Plan. The meeting agenda is to develop the Hazard Analysis for Nelson County which is a major part of the Multi-Hazard Mitigation Plan. It is from this Hazard Analysis that Mitigation Projects will be developed. Through the hazard mitigation planning process, Nelson County and its communities can identify hazard mitigation measures. Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risks from hazards.
THIS WEEK
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Karen Molmen
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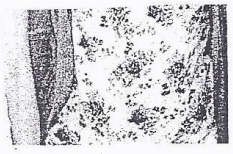

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high was $21,012. Only 3.5 cents from every dollar of gross revenue was necessary to cover interest expense in 2013, up from 2.8 in 2012. Since 2006, interest expense as a percent of gross revenues generally has improved because of lower interest rates and much higher gross revenues."

The Red River Valley and crop farms typically had stronger profitability, solvency and repayment capacity than other regions and farm types. Exceptions were 2013, 2009 and 2007, when the north-central region, and 2005, when the south-central region had the best performance. Also, in 2005, livestock farms had better financial performance than other farm types.

"In 2013, farms with sales of less than $500,000 were nearly three times more likely to have a

(Continued On Page 7)

Nelson County Updating Hazard Mitigation Plan

Nelson County is in the midst of updating its Hazard Mitigation Plan. A planning meeting will be held Wednesday, Nov. 12, 2014 at 7:00 p.m. in the Nelson County Courthouse in Lakota.

The public is invited to this meeting to provide input into the Nelson County Hazard Mitigation Plan. The meeting agenda is to develop the Hazard Analysis for Nelson County which is a major part of the Multi-Hazard Mitigation Plan. It is from this Hazard Analysis that Mitigation Projects will be developed.

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For more information or to get answers to questions, please contact Sharon Young at the Nelson County Courthouse at 701-247-2472.

LAKOTA AMERICAN
Volume 113 -- No. 51
Wednesday, November 5, 2014

LAKOTA AMERICAN

OFFICIAL NELSON COUNTY NEWSPAPER

Lakota, North Dakota 58344

USPS 303-400

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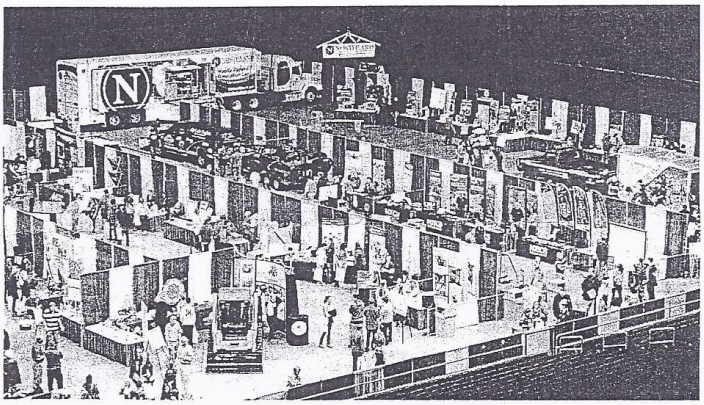

Pictured is an overhead view of the Northern Valley Career Expo that was held in Grand Forks Oct. 29.

15 LHS Students Attend 3rd Annual Northern Valley Career Expo Oct. 29

Nearly 1,500 sophomore students from 27 high schools, including 15 from Lakota High School, attended the third annual Northern Valley Career Expo Oct. 29 in Grand Forks, meeting 70 companies and post-secondary schools and attending two of 22 break-out seminars covering six unique career fields.

The Northern Valley Career Expo has introduced nearly 4,000 students to career opportunities available in Northeast North Dakota and Northwest Minnesota since the event launched in 2012.

Based on student survey responses, about 77 percent of attendees to date are more inclined to remain in the region to pursue careers as a result of the Expo.

Companies bring interactive exhibits designed to introduce students to regional workforce demands for skilled, technical and career paths, about opportunities available with Northern Red River Valley employers.

"This Expo is just one way we are working to address the prevalent need to retain youth in the region to meet our growing workforce demands," said Grand Forks Region EDC Vice President Keith Lund.

"This event is part of a broad regional workforce retention effort," Lund said. "We hope that as these students are planning their futures, we can help influence them to stay in the region because of the exciting career opportunities here."

The annual event is organized by education, economic development, and workforce organizations in Northeast North Dakota and Northwest Minnesota. For more information, visit www.northernvalleycareers.com.

ACT Scores In State Rank High Among The States Requiring Test

North Dakota students' per- population, which ACT research

The Lake Region Invitational girls basketball tournament champions for 2014 are the Lakota-Edmore Raiders. The team defeated North Star 49-28 to earn the crown Saturday evening at the Devils Lake Sports Center. In the front row from left are Kalli Wittenhagen, Miranda Martinson, Taylor Anderson and Ashtyn Pesek. In the back row from left are Doug Freije, Assistant Coach; Montana Halberg, Cassandra Twedt, Fallyn Freije, Jaedyn Pesek, Kaiti Amble and Duane Connell, Head Coach.

Open House Winners Named

The Lakota Community Club held their 23rd Annual Open House Day in Lakota on Saturday, Dec. 6. There was the hustle and bustle of the Christmas Season around Lakota and many from Lakota and the surrounding area attended the open houses. Several business owners expressed their appreciation and hope for continued patronage by serving refreshments and giving away door prizes.

Door prize winners of $20.00 gift certificates from the Citizens Community Credit Union are: Sue Bruckner, Wimers Supermarket; Lori Schuh, 218 Main Salon; and Father Steve Meyer, Cenex.

Door prize winners at the State Bank of Lakota are Donna Robinson, Father Steven Meyer, Barb Kjorsvik, Marge Peterson and Beverly Smith.

Tami Wentz was the door prize winner of a gift certificate at Elaine's House of Dreams.

Blair Satern was the door prize winner at Four Seasons Lounge and Seasons Cafe. He won a trip for two to Las Vegas.

Ruby Leith was the door prize winner at the Fitness Center and she won a shoe bag and a water bottle.

Door prize winners at Farmers Union Oil Co. are Kristi Hoffarth, pizza for a year; pizza winners are Rita Heinz, Gloria Estvold and Kassi Fogelquist; Mary Estvold won the movie night; Jay from Grand Forks won the can cooler and winners of chairs are Bob Miller, Brandon Hanson, Rhoda Messner and Richard Mork.

Door prize winners at 3rd

(Continued On Page 5)

Lakota Youth Dies In Accident On Hwy. 1

Sgt. Dolf H. Oldenburg, North Dakota Highway Patrol, Grand Forks office, reports that at approximately 4:30 p.m. on Friday, Dec. 5 an accident happened on North Dakota Highway 1 a half mile north of Lakota that took the life of a 13-year-old boy.

Dustin Jorde, Lakota, was killed riding a 2011 Kawasaki Dirt Bike motorcycle.

According to the official Highway Patrol report Shelby Lorenz, 18, from Lawton, was driving a 2013 Ford Edge north on ND Highway 1.

Jorde, on the motorcycle, was on Nelson County 8 heading west. The motorcycle failed to yield at a stop sign and crossed onto ND Highway 1 where it was struck by the Ford Edge. Both vehicles entered the west ditch of the highway where they came to rest. The driver of the motorcycle was wearing a helmet and was thrown off during the collision. The driver of the Ford Edge was wearing a seat belt and was uninjured. The driver of the motorcycle was transported to Mercy Hospital in Devils Lake where he was pronounced deceased.

The accident remains under investigation by the North Dakota Highway Patrol.

The Lakota Ambulance Service, Lakota Fire Dept. and Nelson County Sheriff's office also responded to the accident.

County In Midst Of Updating Hazard Mitigation Plan

Nelson County is in the midst of updating its Hazard Mitigation Plan. A planning meeting will be held on Wednesday, Dec. 17, 2014, at the Nelson County Courthouse in Lakota at 7:00 p.m. The public is invited to this meeting to provide input into the Nelson County Hazard Mitigation Plan.

The purpose of the meeting is to develop and prioritize Hazard Mitigation Projects to be put in the 2015 Multi-Hazard Mitigation Plan to make the projects eligible for funding. It is important that each community and the county be represented so their projects can be included.

Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risks from hazards.

For more information or to get answers to questions, please contact Sharon Young at the Nelson County Courthouse at 701-247-2472.

Lakota Electric Rates Are Going Up

Lakota Municipal Utilities customers will see an electric rate increase on their utility bill effective Jan. 1, 2015 as approved at the Dec. 1, 2014 City Council meeting. This rate increase was a recommendation from a rate study conducted by Missouri River Energy services (MRES), one of Lakota's power suppliers. As a public power utility, Lakota is carefully managing its resources and operations to provide a reliable, affordable service. Many other utilities are also experiencing cost pressures, causing electric rates to steadily increase across the region.

Another reason for an adjustment of our electricity rate is caused in part of an increase by MRES to the city of Lakota of 8.75% effective Jan. 1, 2015. This increase was caused by [illegible]

http://www.energystar.gov/campaign/home. Please remember that Lakota Municipal Utilities does offer a budget billing program to help customers even out payment over the course of the year to help better prepare your finances. If you have any questions please contact the city hall at 247-2454.

Below are the new rates approved by the City Council.

Electricity

Current & Proposed Rates			
Customer Class	Rate Conpenents	Current Rates	effective January 1, 2015
Overall Increase			
Residential	Customer Charge	$ 12.00	$ 13.00
	Energy Charge		
	June-August	$ 0.070	$ 0.0795
	Sept.-May:		
	0-1,200 kWh	$ 0.070	$ 0.0795
	Over 1,200 kWh	$ 0.062	$ 0.0700
Commercial	Customer Charge	[illegible]	[illegible]

North Dakota anglers are encouraged to refer to the 2014-16 North Dakota Fishing Guide http://gf.nd.gov/fishing/fishing-regulations-guide or the State Game and Fish Department's website for winter fishing regulations.

In addition, anglers can visit the Game and Fish website <http://gf.nd.gov/>, gf.nd.gov for an extensive list of fishing questions and answers <http://gf.nd.-gov/fishing/other-fishing-information/fishing-conservation-faqs>

Some winter fishing regulations include:

--A maximum of four poles is legal for ice fishing. However, when fishing a water body where both open water and ice occur at the same time, an angler is allowed a maximum of four poles, of which no more than two poles can be used in open water.

--Tip-ups are legal, and each tip-up is considered a single pole.

--There is no restriction on the size of the hole in the ice while fishing. When a hole larger than 10 inches in diameter is left in the ice, the area in the immediate vicinity must be marked w natural object. See regulatio more information.

--It is only legal to releas back into the water immed after they are caught. Once is held in a bucket or stringer, they can no lone legally released in any water.

--It is illegal to catch fist transport them in water.

--It is illegal to leave fisl cluding bait, behind on the ic

--Depositing or leaving ar

(Continued On Page 5)

LAKOTA AMERICAN
Volume 114 -- No. 4
Wednesday, December 10, 2014

LAKOTA AMERICAN

OFFICIAL NELSON COUNTY NEWSPAPER

Lakota, North Dakota 58344

USPS 303-400

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This Is The Last Chance For LED Christmas Light String Rebate

Lakota Municipal Utilities and Bright Energy Solutions(R) is ending its rebate on special holiday LED lighting on Dec. 31, 2014 and will not offer it in 2015.

With the holiday season fast approaching, many people are ready to brighten their home by hanging holiday lights. Decorative light strings lend a festive glow to any area and add that extra touch during the holiday season.

If you're ready to purchase new light strings, now is the time to consider buying ENERGY STAR(R) qualified lights that use LED technology. LED lighting consumes 75 percent less energy than conventional incandescent light strands and can last up to 10 times longer. They also are cool to the touch reducing the risk of fire, and are nearly indestructible.

You'll save even more money with a **$3.50 rebate** offered by Lakota Municipal Utilities and Bright Energy Solutions. You may purchase up to six strings for a total rebate of $21. As we said before, this rebate ends Dec. 31, 2014. Don't miss out!

For more information about the Bright Energy Solutions incentive, stop by the utility office, or call us at 247-2454. Or, you can visit www.brightenergysolutions.-com.

Sen. Joan Heckam

Lakota Elementary School Christmas Program Dec. 11

The Lakota Elementary School students will be presenting their Christmas Program on Thursday, Dec. 11 at 7:00 p.m. in the Lakota High School Gymnasium.

This year's program is a musical based on Tchaikovsky's Nutcracker suite. The sixth graders will be acting out the story with the fifth graders narrating.

Each class will have a special number to do on stage as the residents of Toyland and Candyland perform for "Clara and The Nutcracker Prince".

Roman Steffan received a T-shirt for reaching 100 points as an Accelerated Reader at the Lakota Elementary School.

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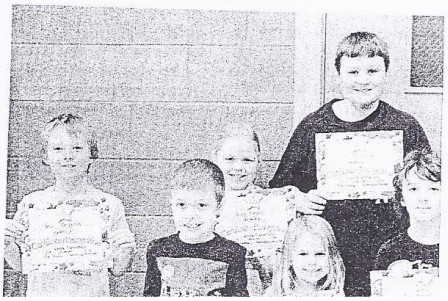

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541 01-01-15 0001A02 4P 25
MRS. RICHARD YOUNG
PO BOX 202
MICHIGAN ND 58259-0202

Nelson County Arena

USPS 376-860 | Michigan, North Dakota | Friday, November 7, 2014

Library to Raffle North Dakota Books

The Bernice Ferguson Community Library in Michigan will be selling raffle tickets on 11 North Dakota related books. The tickets will sell for $1 a piece and will be available on Nov. 10th at the library, our local businesses and from all library board members. There are 11 total books which will be raffled in three separate bundles: Adults, 1 set of 4 books, 1 set of 3 books and kids, 1 set of 4 books. This gives you three chances to win. Some of the books have been signed by the authors. Stop by the library to see the books in person. The drawing for the books will be held on Santa Claus Day. Date to be announced later.

Titles and authors of our raffle books:

"Visions of the Prairie, My North Dakota Journey" by David Paukert (SIGNED by author).

"Building A House, Making a Home, A History of the North Dakota Governor's Residence" by First Lady Betsy Dalrymple (SIGNED by author).

"On Golden Plain" by Les Kletke with John Vasichek (SIGNED by all 33 men who contributed their stories).

"Finding Faith in the Field" by Benjamin Duane Hylden (SIGNED by author).

"Hutterites, The Nine, Our story to Freedom".

"I Paid My Debts....., A Norwegian-American Immigrant Saga of Life on the Prairie of North Dakota" by Lloyd A. Svendsbye.

"15 Months of Winter, My Year in North Dakota" by John Bayer.

KIDS BOOKS:

"Santa is Coming to North Dakota" written by Steve Smallman, Illustrated by Robert Dunnand and Jim Mitchell.

"P" is for Peace Garden, A North Dakota Alphabet", written by Roxane B. Salonen, Illustrated by Joanna Yardley.

"My First Book about North Dakota" by Carole Marsh.

"50 Below Zero" by Robert Munsch & Micheal Martchenko.

Thanks to the following people for donating these books for our raffle: David Paukert, John Vasichek, Benjamin Duane Hylden, Sylvia K. Daws, Rita Hjelseth, Maria Vasichek.

First United Bank's Spuds & Sweets

On October 30, First United Bank sponsored Spuds & Sweets. Baked potatoes with a variety of toppings were served. Customers enjoyed apple crisp for dessert.

Door Prize winners are as follows: Sherrie Kjorsvik - $100 Cabalas Gift Card, Ellen Ringdahl - Camo Cooler and Casey Miller - Set of Steak Knives.

Congratulations to the winners. Thank you for everyone that came and enjoyed this event.

Mark your calendars. First United Bank's Christmas Open House will be held Thursday, December 11.

Library Thanks for Books

The library would like to thank the following people for their generous donations of books.

Becky Nelson
Bernice Ferguson
Robbyn Maresh

Sylvia K. Daws—who donated a special signed copy of Betsey Dalrymple's new book "Building a House/Making a Home" A history of the North Dakota Governor's Residence.

Thanks to our recent book donations our junior high section has vastly improved.

Rhonda Buhr was elected our new vice president. Other board members are Rita Hjelseth, president, Beth Donaghy treasurer, Karissa Daws secretary and Maria Vasichek promotion.

Upcoming events:

Story Hour—Saturday, Nov. 15th at 11am at the library.

Fundraising Raffle—Prizes will be three bundles (2 adult and one children) of North Dakota related books. Books will be on display at the library. $1 tickets will be available for purchase at local businesses and from any board member starting Nov. 10th. Watch for an upcoming article about the raffle!

Most Measures Fail in Election Tuesday

In early voting results it appeared all but one of the measures on the North Dakota ballot were defeated. The measure 2 to stop a proposed tax on transfer of property was the only one that appeared to pass.

Incumbents were winners in statewide ballots including Kevin Cramer for Congress, Al Jaeger for ND Secretary of State, Doug Goering for Ag Commissioner, Wayne Stenehjem for Attorney General, Brian Kalk and Julie Fedorchek fo9r Public Service Commissioners, and Ryan Rauschenberger for Tax Commissioner

Nationally Republicans were defeating Democrat officeholders for Congressional seats and it appears the Republicans will control both houses of Congress this next term.

This was an off-year election so the term of the President was not up for election this time, so President Obama will serve two more years before the next Presidential election is held.

In area voting, the incumbents apparently were winners in the legislative races in District 23. Joan Heckaman, a Democrat, defeated John Jacobson for State Senator and Republicans Bill Devlin and Don Vigesaa were ahead of former legislator Ben Vig, and Austin Langley, their Democrat opponents..

Nelson County voters favored Becky Nelson for county recorder/clerk of court over Joanna Lonski.

Lamb Baby Shower November 23

A Baby Shower for Jax Lamb, son of Julie & Jake Lamb, will be held on Sunday, November 23rd @ 2pm @ Dahlen Lutheran Church. Anyone interested in being on the shower committee please contact Lori Ternquiat @ 384-6160.

Everyone is welcome!!!

Michigan Grocery Store to Observe 5th Anniversary

Michigan Hometown Foods Inc. is celebrating its 5th anniversary this week and plans a weeklong celebration.

Today, Friday, November 7, snacks, coffee and cake will be served from 2:00 to 6:30 p.m.

On Saturday the ' band Sweet Freedom will be playing at the Wagon Wheel with old time music from 6-8 p.m. and from 9 pm to 12 midnight classic rock and country music..

Hazard Mitigation Plan Meeting Set November 12

Nelson County is in the midst of updating its Hazard Mitigation Plan. A planning meeting will be held Wednesday, November 12, 2014 at the Nelson County Courthouse in Lakota at 7:00 PM.

The public is invited to this meeting to provide input into the Nelson County Hazard Mitigation Plan. The meeting agenda is to develop the Hazard Analysis for Nelson County which is a major part of the Multi-Hazard Mitigation Plan. It is from this Hazard Analysis that Mitigation Projects will be developed.

Through the hazard mitigation planning process, Nelson County and its communities can identify hazard mitigation measures. Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risks from hazards.

For more information or to get answers to questions, please contact Sharon Young at the Nelson County Courthouse at 701-247-2472.

NCAC Asks for You to Join Us in Honoring Our Veterans

The Nelson County Arts Council presents "Honoring Our Veterans", a Veterans art exhibit. The exhibit is open for viewing at the Pekin Auditorium, November 9-15th 2014. The hours will be from 1pm-7pm daily. The Nelson County Arts Council will also be honoring our Veterans on November 11, 2014 with some special guests. The Color Guard will have a presentation outside of the Pekin Fire Hall at 4:30. Then join us for coffee, cookies, and conversation with Veterans back at the Auditorium. The Fargo Vet Center Bus- Readjustment Counseling Service will also be onsite that day. Donations are always welcome and will go to help our Heroes in need! We do ask to not take any photos during the exhibit.

Gloria Estvold and Gunny Schmidt to be Honored at Good Samaritan November 12

Join us for coffee to show our Appreciation to Gloria Estvold and Gunny Schmidt for their many years of volunteer services at Good Samaritan Society-Lakota on November 12th 2014 at 2:30 p.m.

Dahlen Lutheran Church Thankoffering Service Nov. 16

The Dahlen Lutheran Church Thankoffering Service will be held on Sunday, November 16, 2014 at 10:45 a.m.

Potluck dinner will be served following the service with Group II in charge of serving.

WELCA members are reminded to bring their Thankoffering boxes or envelopes.

Everyone is Welcome!

Bow Hunting is Prohibited at Stump Lake Park

The Nelson County Park Board decided to prohibit bow hunting at Stump Lake Park due to the low number of deer. No hunting of any kind is allowed at the park at this time.

Mon 11/24/2014 9:58 AM

Hi, Ken – Could you please send me a write-up about the purpose/agenda of the next MHMP planning meeting to send out to my cities? Something specific about what they need to bring as far as their mitigation projects, etc. They will be meeting next Monday for their monthly council mtgs. I plan to be in today & tomorrow, then I'm off until Monday for Thanksgiving (yay!). So I would like to send something out by tomorrow if possible. Then they can discuss their project ideas at their meeting. We had no reps from Petersburg, Pekin, or McVille city councils at our last meeting so I want to make sure they especially know what they need to do before the next MHMP mtg. Petersburg City & Pekin City have actually missed the last two meetings.

I finished my school project last week, and so I was able to spend most of Friday going over the handouts from the last meeting. I hope to do more today and will eventually send you a list similar to what I did last time with any additions, revisions, etc. I have gotten in some of the information from the people that you told to send things to me. Others have called and are working on getting their information to me.

The courthouse community room was available so I reserved it for Wednesday, December 17 at 7:00pm.

Thanks! *Sharon Young*

Sent 11/24/2014 12:40 PM

Sharon, you can use something like this

The Nelson County Multi-Hazard Planning Committee will be meeting Wednesday, December 17 at 7:00 PM at the Nelson County Courthouse in Lakota.

The purpose of the meeting is to develop and prioritize Hazard Mitigation Projects to be put in the 2015 Multi-Hazard Mitigation Plan to make the projects eligible for funding. It is important that each community and the county be represented so their projects can be included.

Bring your projects on a piece of paper so they do get included. Use the format on the last page. To help you develop mitigation projects, listed below are Nelson County projects from the 2010 Mitigation Plan and below that are FEMA approved projects from other mitigation plans.

Listed below are projects from the 2010 Multi-Hazard Mitigation Plan. During the meeting we will determine which ones are completed, which ones are on-going, and which ones are carried over (Status).

(The projects were listed in a table that is not included here)

Tue 11/25/2014 1:53 PM

I think the project list from the 2010 Multi-Hazard Mitigation Plan should have the original column on the left side that shows the City or County name. Otherwise it is hard to know which city the project is for. Like when it says "Repair city lagoon" they would know which city the project is referencing. Make sense? Could you add that back in and re-send please?

I would also like in my email to the cities to say something like: that we want them to come to the meeting with their mitigation ideas using the sheet you passed out at the last mtg (attached). I don't want them to get the impression they have to fill out the worksheet you sent, that the worksheet is just

for reference for now and that we will be using their mitigation ideas to fill out the worksheet. I'm not saying that very well……can you revise it to make it better? Words aren't coming to me today very well apparently! I just don't want them to look at that worksheet and all those column headings and right away go, oh my goodness we have to fill all that out? I guess I want it clear that all we really need is their ideas and for them to come to the meeting ready to work completing the worksheet. Make sense too?

Sharon

Wed 12/3/2014 11:46 AM

Ken – Should anything be add/changed in this meeting notification for our next MHMP planning meeting?

Sharon Young

News Release

For Immediate Release

December 3, 2014

Nelson County is in the midst of updating its Hazard Mitigation Plan. A planning meeting will be held Wednesday, December 17, 2014 at the Nelson County Courthouse in Lakota at 7:00 PM. The public is invited to this meeting to provide input into the Nelson County Hazard Mitigation Plan.

The purpose of the meeting is to develop and prioritize Hazard Mitigation Projects to be put in the 2015 Multi-Hazard Mitigation Plan to make the projects eligible for funding. It is important that each community and the county be represented so their projects can be included.

Counties with an approved Hazard Mitigation Plan become eligible for Hazard Mitigation Grants which provide funding for sustained actions taken to reduce or eliminate long-term risks from hazards.

For more information or to get answers to questions, please contact Sharon Young at the Nelson County Courthouse at 701-247-2472.

-End-

Wed 12/10/2014 9:28 AM

Thanks Kathleen! I appreciate your support as well as Joe's. I think it would be appropriate after I open the meeting to call on you for the message you indicated below. Joe, you are also welcome to say something at that point if you would like. Then I suppose we need to get to work with the planning team on whatever Ken has in store for us! I know that we are going to look at our old mitigation projects and then address adding in the new ones, so I imagine we have plenty to do that evening. The coffee will be on with something to go with it!

See you all next week!

Sharon Young

From: Donahue, Kathleen B. [mailto:kdonahue@nd.gov]
Sent: Wednesday, December 10, 2014 8:56 AM
To: Young, Sharon; Lies, Robert J.
Cc: Ken Jarolimek
Subject: Mitigation Planning meeting -- Wednesday, December 17th

Hi Sharon: I am making travel arrangements for next week's meeting. It looks like Joe Lies will be available too for the mitigation planning meeting at 7 p.m. Wednesday, December 17th. (I asked Annette Scholl to reserve a room at Sun Lac!)

Also, if you call on me, my message will be pretty simple:

1) Our goal is to make sure Nelson County has a mitigation plan that works for all of you, that will be usable for mapping out how you want to protect the communities.
2) Our secondary goal is to help the counties with meeting federal requirements.

That's basically it – I will be available to answer questions if any surface. If you would like to meet with Ken Jarolimek, Joe and me before the meeting, just let us know.

Kathleen Donahue

Individual Assistance, Mitigation and Recovery Planning

Deputy Recovery Chief, N.D. Department of Emergency Services

Division of Homeland Security

Planning Meeting Advertisement, County Website

Planning Meeting Advertisement, Facebook

Multi-Hazard Mitigation Committee Planning Meeting Minutes

Nelson Co. Hazard Mitigation Planning Kickoff Meeting / LEPC Meeting
07.30.14 – 7:00 PM

Present: Herb Schultz, Jaima Curry (LEPC), Vicky Engen, Renae Arneson, Ron Miller (LEPC), Duane Avdem (LEPC), Steve Johnston, Nancy & Dan Marquart, Keith Olson (LEPC), Lauri Rysavy, Ed Pawlikowski, Amie Vasichek, Todd Whitman, Marv Narum, Doug Stein, Don Fougner (LEPC), Marvin Massey, Janet Tweed (LEPC), Bruce Ellertson, Jason Sorlien (LEPC), Julie Ferry (LEPC), Milt Schmidt and Sharon Young (Nelson Co. Emergency Manager)

Nelson Co. Emergency Manager Sharon Young welcomed community members and opened the meeting by introducing Ken Jarolimek of Wenck Consulting. The website is www.wenck.com if more information needed. This is the agency who has been contracted with to update the current Hazard Mitigation Plan. A presentation and handout was provided to all attendees to explain why the plan was needed, authorizing FEMA legislation, the process for completing the plan and timeline of activities. (See handout) Representatives from Nelson Co. were present to form a Multi-Hazard Planning Committee. A public opinion survey was distributed for completion and should be returned by September 10th for inclusion in future planning. The group will begin planning meetings in September. The revised plan needs to be submitted to the State office by February 2015.

A brief LEPC meeting was called to order by President Ron Miller at 8:05 PM in the Nelson Co. Courthouse Community Room. There is the capability to install flat screen television in the Community Room. Motion by Don Fougner, seconded by Jan Tweed to purchase the accessory wires and antenna needed for installation of the equipment for approximately $200. Motion carried. As this was the only agenda item, Chairman Ron Miller adjourned the meeting.

Respectfully submitted,

Julie Ferry
LEPC Secretary

Nelson Co. Hazard Mitigation Planning Meeting
09.17.14 – 7:00 PM

Present: Herb Schultz, Jaima Curry (LEPC), Vicky Engen, Ron Miller (LEPC), Keith Olson (LEPC), Ed Pawlikowski, Amie Vasichek, Todd Whitman, Janet Tweed (LEPC), Bruce Ellertson, Sharon Young (Nelson Co. Emergency Manager), Joanne Brennan, Tim Lee (LEPC), Mark Opoien (LEPC).

Nelson Co. Emergency Manager Sharon Young opened the meeting and then turned it over to Ken Jarolimek of Wenck Associates, Inc. Mr. Jarolimek is the consultant hired to facilitate the plan update.

The focus of tonight's meeting was to review draft sections of the 2015 Multi-Hazard Mitigation Plan.

The planning team reviewed the *Executive Summ*ary, reviewed & revised the *Nelson County Hazard Prioritizatio*ns, and outlined six goals for the mitigation strategy.

Next the group reviewed the first three draft sections of the plan: *Introduction, Planning Process & Methodologies, and Assets at Risk.* Handouts of these sections were provided to all attendees. The planning team's input was used to make corrections, additions, and revisions to each section.

The next planning meeting will be Wednesday, November 12, 2014 at 7:00pm in the Nelson County Courthouse Community Room in Lakota. The planning team will be conducting a Risk Assessment during this meeting.

Respectfully submitted,

Sharon Young,
Nelson County Emergency Manager

Nelson Co. Hazard Mitigation Planning Meeting
11.12.14 – 7:00 PM

Present: Herbert Schultz, Jaima Curry (LEPC), Keith Olson (LEPC), Amie Vasichek, Todd Whitman, Bruce Ellertson, Sharon Young (Nelson Co. Emergency Manager), John Steffan (LEPC), Ben Varnson, Maynard Loibl, Rita Loibl, Lori Ternquist (LEPC), Don Fougner (LEPC), Steven Dahl, Diane Schock, Lauri Rysavy, Jason Sorlien (LEPC).

Nelson Co. Emergency Manager Sharon Young opened the meeting and then turned it over to Ken Jarolimek of Wenck Associates, Inc. Mr. Jarolimek is the consultant hired to facilitate the plan update.

The group reviewed revisions made at the last meeting to the first three sections of the 2014 Multi-Hazard Mitigation draft plan – Section 1: *Introduction, Section 2: Planning Process & Methodologies, and Section 3: Assets at Risk.* Ken asked the group for help with completing some of the things that were still missing.

Risk Assessment/Hazard Analysis
Members were given a copy of the Nelson County 2013 Threat Hazard Identification Risk Assessment (THIRA) and reviewed the hazard prioritizations identified.

Ken explained the risk analysis criteria in regards to probability & magnitude. This criteria was used by the planning team to assess the Frequency, Impact, and Risk Class of each hazard.

Next the group reviewed Section 4 of the plan: *Risk Assessment/Hazard Profiles.* Handouts of these sections were provided to all attendees. Those in attendance were divided into small groups and each group worked on reviewing individual hazard sections. Then each group reported back to the entire planning team giving their comments and recommendations for revisions or additions. Ken will use the planning team's input to make corrections, additions, and revisions to Section 4.

The next planning meeting will be Wednesday, December 17, 2014 at 7:00pm in the Nelson County Courthouse Community Room in Lakota. The planning team will be reviewing the Mitigation Strategy during this meeting and adding Mitigation Projects into the plan.

Respectfully submitted,

Sharon Young,
Nelson County Emergency Manager

Nelson Co. Hazard Mitigation Planning Meeting
12.17.14 – 7:00 PM

Present: Duane Avdem (LEPC),Herbert Schultz, Joanne Brennan, Jan Tweed (LEPC), Milt Schmidt, Ron Miller (LEPC), Steve Johnston, Tim Lee (LEPC), Rich Riely (LEPC), Julie Ferry (LEPC), Mark Opoien (LEPC), Jaima Curry (LEPC), Keith Olson (LEPC), Todd Whitman, Sharon Young (Nelson Co. Emergency Manager), John Steffan (LEPC), Ben Varnson, Don Fougner (LEPC), Steven Dahl, Diane Schock, Lauri Rysavy, Jason Sorlien (LEPC). Kathleen Donahue (NDDES), Joe Lie (NDDES)

Nelson Co. Emergency Manager Sharon Young opened the meeting. She gave a brief overview of the hazard mitigation plan update project and thanked the planning committee for their help and time put towards updating the plan. Sharon also introduced Kathleen Donahue and Joe Lies from the ND Dept. of Emergency Services. Kathleen is the Deputy Recovery Chief in Individual Assistance and Mitigation & Recovery Planning. Joe is the NE Regional Emergency Response Coordinator. Sharon then turned the meeting over to Ken Jarolimek of Wenck Associates, Inc. Mr. Jarolimek is the consultant hired to facilitate the plan update.

The purpose of the meeting was to review the Mitigation Strategy and add Mitigation Projects into the 2015 Multi-Hazard Mitigation Plan.

The planning team members first reviewed the 2010 mitigation actions and determined which were completed, on-going, carried over or deleted. The planning committee then broke into community groups and worked on identifying & developing new mitigation projects for the 2015 plan. Adding these mitigation projects to the plan will make them potentially eligible for funding.

Ken also explained the hazard mitigation grant application process, how the grants open up after a disaster, and the dollar percentage put towards hazard mitigation. Ken also talked about the Notice of Interest that must be completed to determine if the project is potentially eligible.

After the final draft of the 2015 Hazard Mitigation Plan is completed, it will be available for public and committee comment via the Nelson County website. A hard copy will also be available in the emergency management office.

The current plan expires April 2015.

Respectfully submitted,

Sharon Young,
Nelson County Emergency Manager

Multi-Hazard Mitigation Plan Planning Meetings Sign-In Sheets

Sign In Sheet Nelson County Hazard Mitigation Plan Kick-Off Meeting, July 30, 2014					
Name	Address	Telephone Number	E-Mail Address	Representing	Position
Herbert L Schultz	12350 48TH ST N E	701-384-6134		Self	
Alma Curry	PO Box 346 Aneta	701 326-4131	curryjalma@gmail.com	LEPC City of Aneta	
Jacky Engen	PO BOX 26 Tolna	701 262 4749	engen5@gondtc.com	Tolna City	Auditor
Renee Amason	BOX 275, Mcville	701-322 4343	mcvillend@gondtc.com	City of Mcville	Auditor
Ron miller	BOX 56 mc ville	701-322-515		LEPC PRES	
Duane Audem	Box 55 Pekin	701-296-4444	dandkaudem@stellarnet.com	Pekin Fire	Chief
Steve Johnston	Box 39 Pekin	701-296-4418	Pekin Fire Dept.	City Council	LEPC
Nancy Marquart	206 5th St. E	507-382-6781	nancy.marquart@gmail.com		
Dan Marquart	206 5th St. E.	351-3323	danmarquart52@gmail.com	Nelson County	commission
Keith A Olson	PO Box 145 LaKota	247-2474 270-0684	~~Keith~~ Keiolson@nd.gov	Sheriff Dept	Sheriff

Sign In Sheet
Nelson County Hazard Mitigation Plan Kick-Off Meeting, July 30, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Lauri Rysavy	PO Box 324 Michigan ND 58259	701-2592548	frysavy@polarcomm.com	Michigan City	Mayor
Ed Pawlikowski	202 4th St SE Lakota, ND 58344	701-270-1929	eddyp@polarcomm.com	Lakota	Mayor
Amie Vaaxhal	PO Box 555 Lakota, ND 58344	701-247-2454	lakotacte polarcomm.com	Lakota	Auditor
Todd W Pitman	405 Moon Ave Aneta ND	701-326-4286		Aneta	Mayor
Max Naumann	3950 Co 35 Michigan N.D	7012592652		McHenry township	
Doug Stein	PO Box 245 McVille ND	701-740-8330	dstein@gondtc.com	McVille city	Mayor
Don Fougner	12080 215th NE Aneta, ND.	701-326-4379		Co. Comm.	
Marvin Wrasdy	[illegible]	701 [illegible]		Co Commr	
Janet Reed	Tolna	701-799-4221	deewt@pndtc.com	Tolna	
Bruce Ellertson	Michigan	701-259-2132	bellertson nodaltel.net .com	Michigan	Co Comm

Sign In Sheet
Nelson County Hazard Mitigation Plan Kick-Off Meeting, July 30, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Jason Sorlien	10127 Hwy 2 Lakota	701-740-7046	Jasonsorlien@polarcomm.com	Lakota Fire	Chief
Julie Terry	work - PO Box 365 Finville	701.302.5624	jterry@nd.gov	Public Health	
[illegible]	PO BOX 32 Petersburg	345-8441	MHS@POLARcomm.com	MAYOR Petersburg	
Sharon Young	210 B Ave W, Ste 302 Lakota, ND 58344	701-247-2472	syoung@nd.gov	Nelson County	Emergency Management

Sign In Sheet
Nelson County Hazard Mitigation Planning Meeting, September 17, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Herbert L Schulz	Petersburg ND 12350 487th ST NE	701-384-6134		Self	
Sharon Young	210 B Ave W, STE 302 LAKOTA, ND	701-247-2472	syoung@nd.gov.	Nelson Co Emerg. Mgmt	EM
JOANNE BRENNAN	P.O. Box 275 McVILLE, ND 58254	701-322-4343		City of McVille	Deputy Auditor
Ron Miller	PO 56 McVille 58254	701-788-2284		LEPC Chair McVille FIRE NCHD	LEPC CHAIRMAN
Todd Whitman	405 Main Ave Lakota	701-797-7458		City of Lakota	Mayor
Vicky Engen	PO Box 26 Tolna, ND	701-262-4749		Tolna	City Auditor
Jim Weed	Box 34 Tolna	nd-794-3221		Tolna	LEPC
Keith Olson	PO Box 115 LaKota ND 58344	701-370-0684	Keiolson@nd.gov	Nelson CoSO	Sheriff
Annie Doll	PO Box 505 Lakota	247-2111	lakotacityadm	Lakota	Auditor

Sign In Sheet
Nelson County Hazard Mitigation Planning Meeting, September 17, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Herbert L Schulz	Petersburg ND 12350 48Th ST NE	701-384-6134		Self	
Sharon Young	210 B Ave W, STE 302 LAKOTA, ND	701-247-2472	syoung@nd.gov	Nelson Co Emerg. Mgmt	EM
JOANNE BRENNAN	P.O. Box 275 McVILLE, ND 58254	701-322-4343		City of McVille	Dep. Auditor
Ron Miller	PO 56 McVille 58254	701-788-2284		LEPC Chair McVille Fire WCHD	LEPC CHAIRMAN
Todd Whitman	405 Moon Ave Cheetanno	701-797-7458		City of Pmetta	Mayor
Vicky Engen	PO Box 26 Tolna, ND	701 262 4749		Tolna	City Auditor
Jim Weed	Box 34 Tolna	701-794-8221		Tolna	LEPC
Keith Olson	PO Box 115 LaKota ND 58344	701-990-0684	Keiolson@nd.gov	Nelson CoSO	Sheriff
Annie Boehlke	PO Box 55 Lakota	247-2111	lakotactepolar	Lakota	Auditor

Sign In Sheet
Nelson County Hazard Mitigation Plan Planning Meeting, November 12, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Keith Carson	PO Box 145 LaKota ND 58344	747-2778 770-0891	Keith A Carson	Nelson Co	Sheriff
Don Faugner	12680 215th Ave Lakota, ND	326-4379			C. Commr
Steven Dahl	521 Main St. N. Tolna ND	262-4151	SLdahl@GONDR.com	Tolna city	Counsil
[illegible]	Bay 111 Michigan	259-2584	-0-	Michigan	city council
Lawn Rysavy	PO Box 324 Michigan	259 2548	frysavy@polarcomm.com	Michigan	City Council Mayor
Jason Sorlien	10127 Hwy 2 Lakota	247-2627	Jasonsorlien@polarcomm.com	Lakota	Fire Dept

Sign In Sheet

Nelson County Hazard Mitigation Plan Planning Meeting, November 12, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Keith Carson	PO Box 145 LaKota ND 58344	247-2777 770-0891	Keith.A.Carson	Nelson Co SO	Sheriff
Don Faugner	12290 215th Ave Lantana ND	326-4379			Co. Commr
Steven Dahl	521 Main St. N. Tolna ND	262-4951	SLdahl@GONDR.com	Tolna city	Counsil
[illegible]	Box 111 Michigan	259-2584	-0-	Michigan	city council
Lawn Rysavy	PO Box 324 Michigan	259 2548	frysavy@polarcomm.com	Michigan	City Council Mayor
Jason Sorlien	10127 Hwy 2 Lakota	247-7627	Jasonsorlien@polercomm.com	Lakota	Fire Dept

Sign In Sheet
Nelson County Hazard Mitigation Planning Meeting, December 17, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Kim Miller	PO 56	701-789-1284		LEPC CHAIR Maville Fire NCHD	CHAIR
Steve Johnston	PO 341	701-242-4418		Pekin Fire Dept	Sec.
Ben Larson	Box 446	701-734-3460		NCWRD	Chair
Tim Lee	[illegible]	2184741126		Nelson Cty	Sup't
Rich Riely	P.O. Box 107	701 247 3429		LAKOTA FIRE	PRES.
Julie Terry	~~Nelson~~ PO Box 365	701.322.5624		NGDHU	Adm
Keith Olson	PO Box 145 Lakota	247-2119	Ke.olson@nd.gov	Nelson Co SO	Sheriff
Lauri Rysavy	PO BOX 324 Michigan ND 58359	259-2548		Michigan	Mayor
Mark Opsion	PO Box 502 Maville 58254	322-4325		NCHS	Administrator
Rodol W Robinson	405 Moon Ave Aneta 58212	326.4256		City of Aneta	Mayor
Joe Lies	611 1st Ave N. New Rockford	302.0031	olies@nd.gov	ND DES	Regional Coordinator

Sign In Sheet
Nelson County Hazard Mitigation Planning Meeting, December 17, 2014

Name	Address	Telephone Number	E-Mail Address	Representing	Position
Jason Sorlien	1027 Hwy 2	701-247 2637	Jasonsorlien@polarcomm.com	Lakota Fire	chief
JAIMA CURRY	PO Box 346 ANETA	701-326-4131	CURRY jaima@gmail.com	ANETA city	COUNCIL

E-Mail Sent inviting neighboring emergency managers to participate in the Planning Process

From: Ken L. Jarolimek [mailto:kjarolimek@wenck.com]
Sent: Thursday, September 11, 2014 10:01 PM
To: bensondem@gondtc.com; eddycoem@nd.gov; jcampbell@grandforksgov.com; robert.hook@griggscountynd.gov; kristnelsen@nd.gov; dhuso@nd.gov; banelson@nd.gov; kfranklin@co.barnes.nd.us
Cc: syoung@nd.gov
Subject: Nelson County Hazard Mitigation

Nelson County is in the midst of updating its Hazard Mitigation Plan. A planning meeting will be held September 17, 2014 at the Nelson County Courthouse in Lakota at 7:00 PM. As emergency managers representing Nelson County neighboring counties you are invited to this meeting to provide input into the Nelson County Hazard Mitigation Plan. If you have questions, you may call me at 701-426-.9449 or Sharon Young at 701-247-2472

Ken

Kenneth Jarolimek – Consultant – Safety and Emergency Preparedness

Wenck Associates Inc., 301-1st Street NE, #202, Mandan, ND 58554-3370

www.wenck.com | kjarolimek@wenck.com| D 701.751.6135 | F 701.751.3372 | C 701-426-9449 |

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.

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: Nelson County	**Title of Plan:** Nelson County Multi-Hazard Mitigation Plan	**Date of Plan:** **March, 2015**
Local Point of Contact: **Sharon Young**	**Address:** 210 B Ave. West, Suite 302 Lakota, ND 58344	
Title: **Emergency Manager**		
Agency: **Nelson County Emergency Management**		
Phone Number: 701-247-2472	**E-Mail:** syoung@nd.gov	

State Reviewer:	**Title:**	**Date:**

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region VIII		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

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 Rqtms.	E. Adoption Resolution
1	Nelson County	County Emergency Manager	Sharon Young	syoung@nd.gov	y	y	y	y	
2	Nelson County	County LEPC	Jaima Curry	curryjaima@gmail.com	y	y	y	y	
3	Nelson County	County LEPC	Ron Miller	none	y	y	y	y	
4	Nelson County	County LEPC	Steve Johnson	none	y	y	y	y	
5	Nelson County	County Commission	Dan Marquart	Danmarquart52@gmail.com	y	y	y	y	
6	Nelson County	County Sheriff	Keith Olson	keiolson@nd.gov	y	y	y	y	
7	Nelson County	County LEPC	Bruce Ellertson	bellertson@nodakmutual.com	y	y	y	y	
8	Nelson County	County Public Health	Julie Ferry	jferry@nd.gov	y	y	y	y	
9	Nelson County	County Road Supt	Tim Lee	Timlee.nelson.cty@yahoo.com	y	y	y	y	
10	Nelson County	County LEPC	Mark Opoien	mopoien@nelsoncountyhealthsystem.org	y	y	y	y	
11	Nelson County	County Commission	Maynard Loebl	loibl@stellarnet.com	y	y	y	y	

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 Rqtms.	E. Adoption Resolution
12	Aneta	City	Todd Whitman	none	y	y	y	y	
13	Lakota	City	Amie Vasicheki	lakotact@polarcomm.com	y	y	y	y	
14	McVille	City	Renae Arneson	Mcvillend.gondtc.com	y	y	y	y	
15	Michigan	City	Laun Rysavy	frysavy@polarcomm.com	y	y	y	y	
16	Pekin	City	Duane Aubem	none	y	y	y	y	
17	Petersburg	City	Milt Schmidt	mhs@polarcomm.com	y	y	y	y	
18	Tolna	City	Vicky Engen	Ergen5@gondtc.com	y	y	y	y	

SECTION 2:
REGULATION CHECKLIST

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
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>2-28 Appendix B	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))	Section 2.1.1, Pages 2-1>2-2, 2-8 Appendix B	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 2.1 & 2.4 Pages 2-4>2-6; 2.8 Appendix B	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, 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, Pages 6-1>6-5	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, Pages 6-1>6-5	X	
ELEMENT A: REQUIRED REVISIONS			
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 4.1 through 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 4.1 though 4-15	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 4.1 through 4.15	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))	Secton 4.4.4, Page 4.4-12	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT B: REQUIRED REVISIONS			
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 2.4.1 & 2.4.2 Pages 2.8 >2.20	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 4.4.4, Page 4-12	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, Pages ii & iii, Section 5.1, Pages 5.2>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, Table 5.2.2A, Pages 5.14>5-22	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, Table 5.3B, Pages 5-24>5-26	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))	Section 5.4, Pages 5-27 & 28 Section 6.4.2, Page 6-3 & 6-4	X	
ELEMENT C: REQUIRED REVISIONS			
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 3	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>5.13	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 5	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT D: REQUIRED REVISIONS			
ELEMENT E. PLAN ADOPTION			
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))	Secton 2.1.2, Pages 2-3 & 2-4 Appendix F	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Secton 2.1.2, Pages 2-3 & 2-4 Appendix F	X	
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			

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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

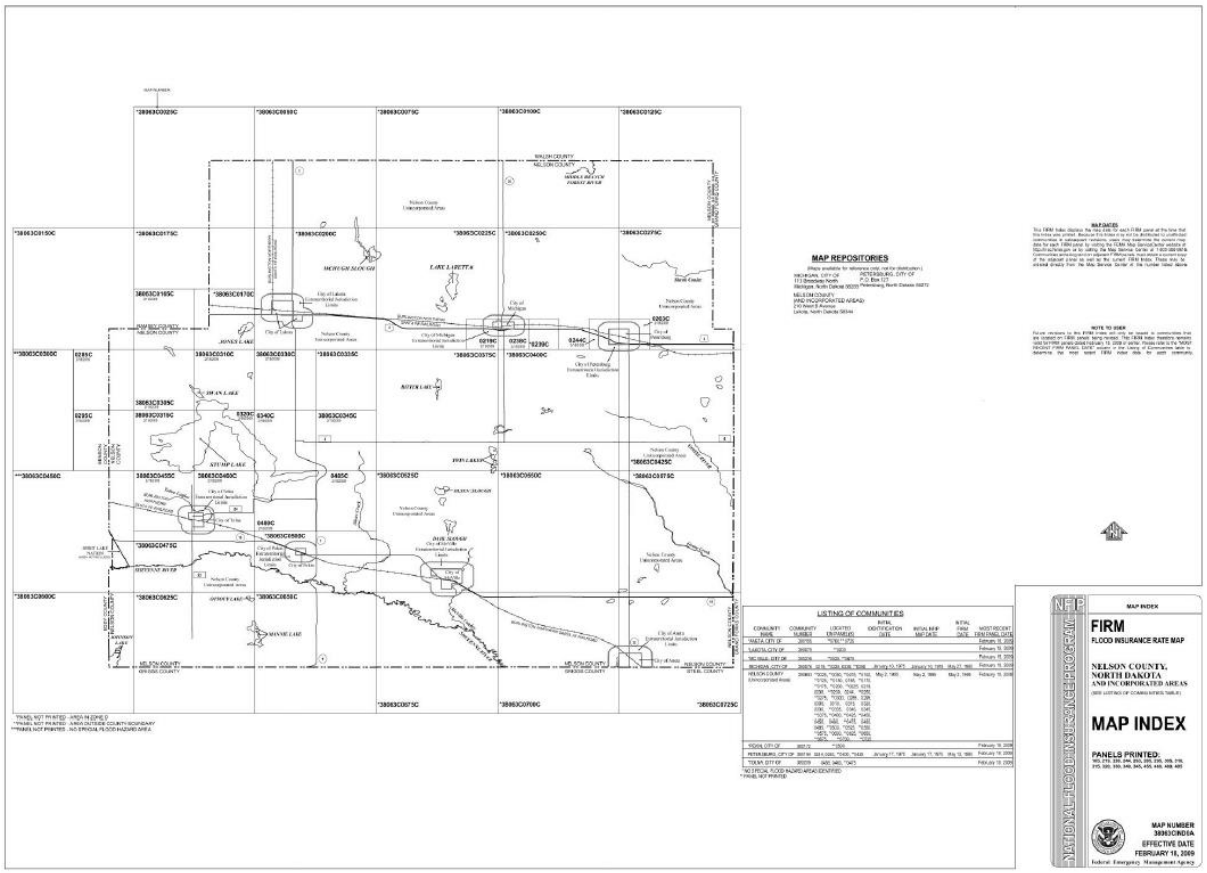
Element B: Hazard Identification and Risk Assessment

Element C: Mitigation Strategy

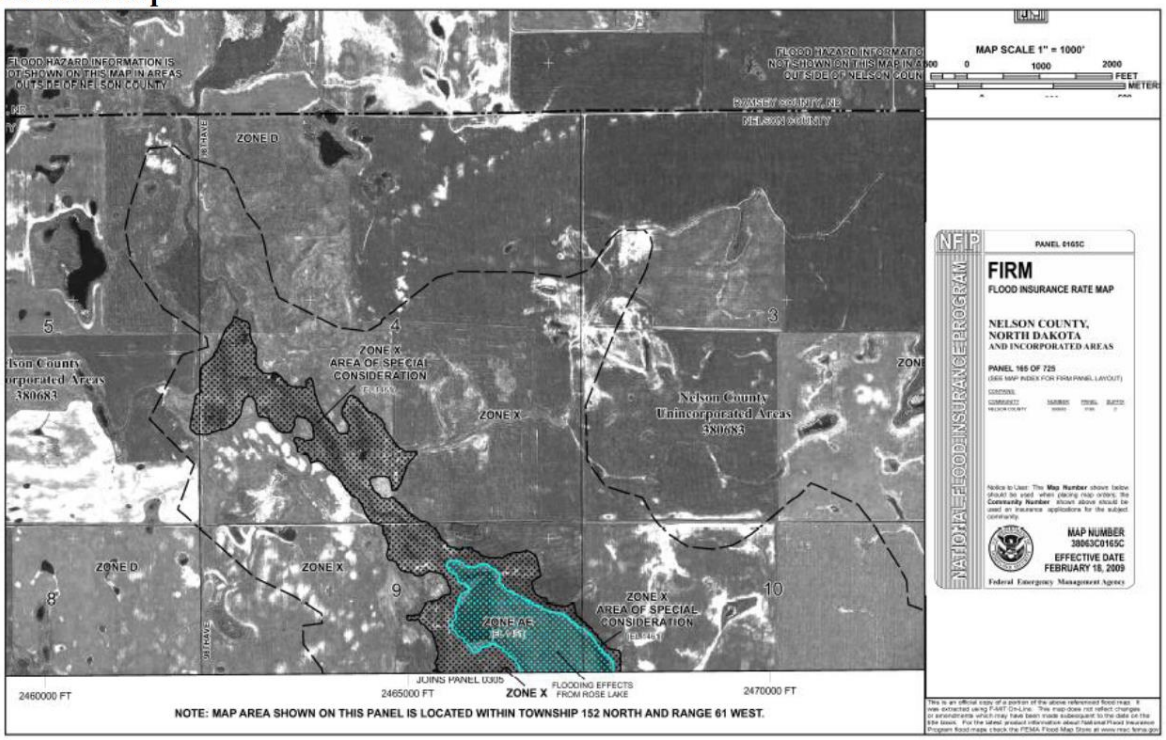
Element D: Plan Review, Evaluation, and Implementation (Plan Updates Only)

B. Resources for Implementing Your Approved Plan

Appendix E: DFIRM Maps



DFIRM Maps


MAP SCALE 1" = 1000'
FLOOD HAZARD INFORMATION IS NOT SHOWN ON THIS MAP IN AREAS OUTSIDE OF NELSON COUNTY
FLOOD HAZARD INFORMATION IS NOT SHOWN ON THIS MAP IN AREAS OUTSIDE OF NELSON COUNTY
RAMSEY COUNTY, ND
NELSON COUNTY
ZONE D
ZONE X
AREA OF SPECIAL CONSIDERATION
Nelson County Unincorporated Areas 380083
ZONE AE
JUINS PANEL 0305
FLOODING EFFECTS FROM ROSE LAKE
2460000 FT
2465000 FT
2470000 FT
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 152 NORTH AND RANGE 61 WEST.
PANEL 0165C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA AND INCORPORATED AREAS
PANEL 165 OF 725
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER 38063C0165C
EFFECTIVE DATE FEBRUARY 18, 2009
Federal Emergency Management Agency

MAP SCALE 1" = 500'
Nelson County Unincorporated Areas 380083
City of Michigan Extraterritorial Jurisdiction 380076
31
32
ZONE D
ZONE A
City of Michigan 380076
PANEL 0219C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA AND INCORPORATED AREAS
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER 38063C0219C
EFFECTIVE DATE FEBRUARY 18, 2009
Federal Emergency Management Agency

MAP SCALE 1" = 500'
250 0 500 1000
FEET
METERS
ZONE D
ZONE A
ZONE X
ZONE D BOUNDARY COINCIDENT WITH CORPORATE LIMITS
City of Michigan
380076
City of Michigan
Extraterritorial Jurisdiction
380076
ZONE D BOUNDARY COINCIDENT WITH CORPORATE LIMITS
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0238C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 238 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
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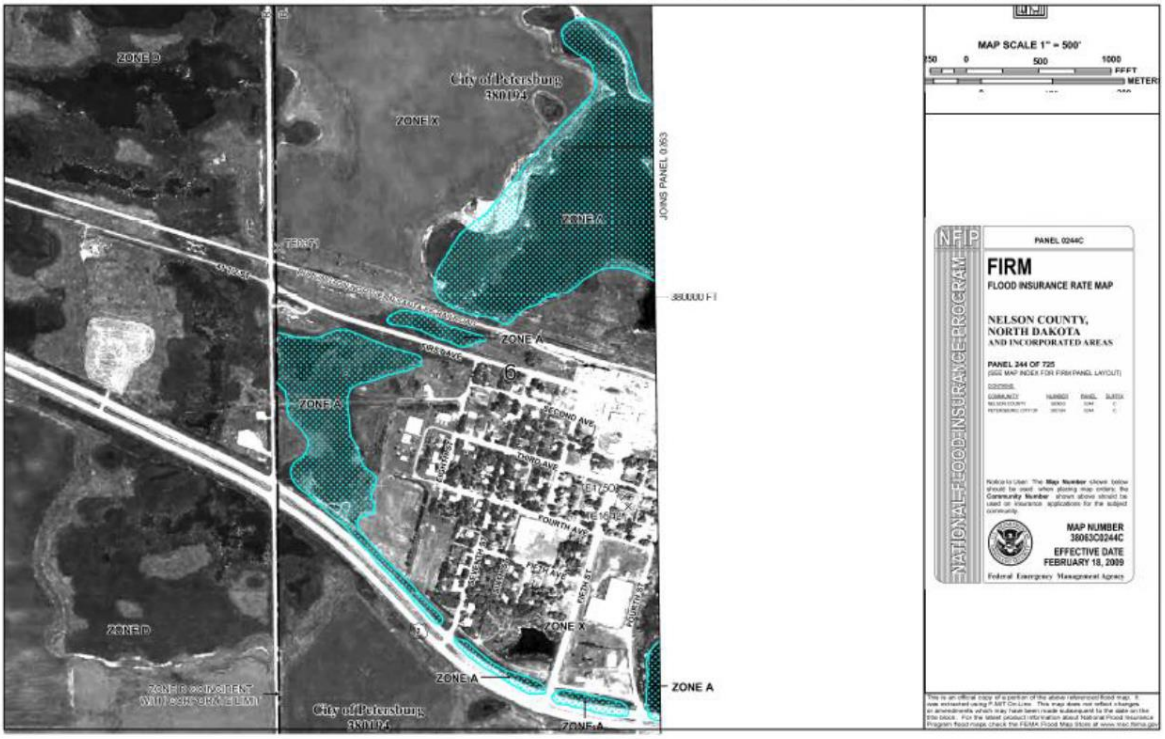
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency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250 0 500 1000
FEET
METERS
ZONE D
City of Petersburg
380194
ZONE X
ZONE A
JOINS PANEL 0353
ZONE A
ZONE A
ZONE D
ZONE D BOUNDARY COINCIDENT WITH CORPORATE LIMITS
City of Petersburg
380194
ZONE A
ZONE X
ZONE A
ZONE A
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0244C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 244 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
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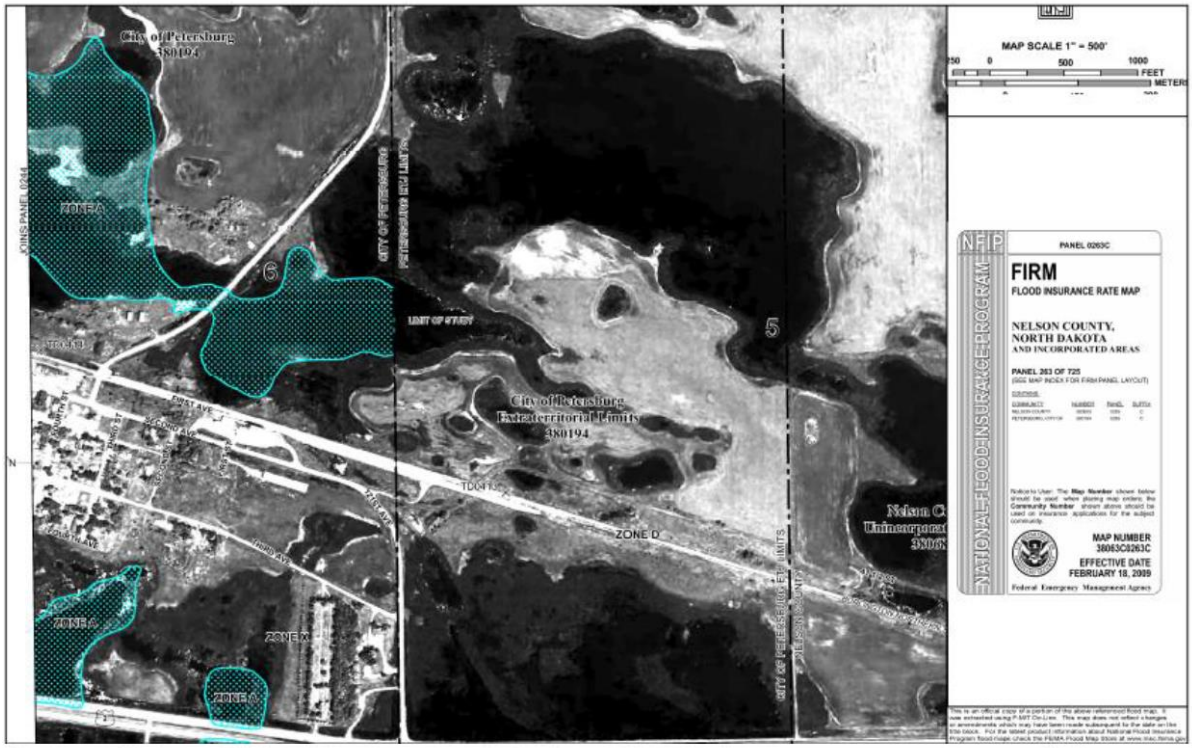
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency


City of Petersburg
380194
ZONE A
6
5
City of Petersburg
Extraterritorial Limits
380194
ZONE D
ZONE A
ZONE X
ZONE A
MAP SCALE 1" = 500'
FEET
METERS
PANEL 0263C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 263 OF 725
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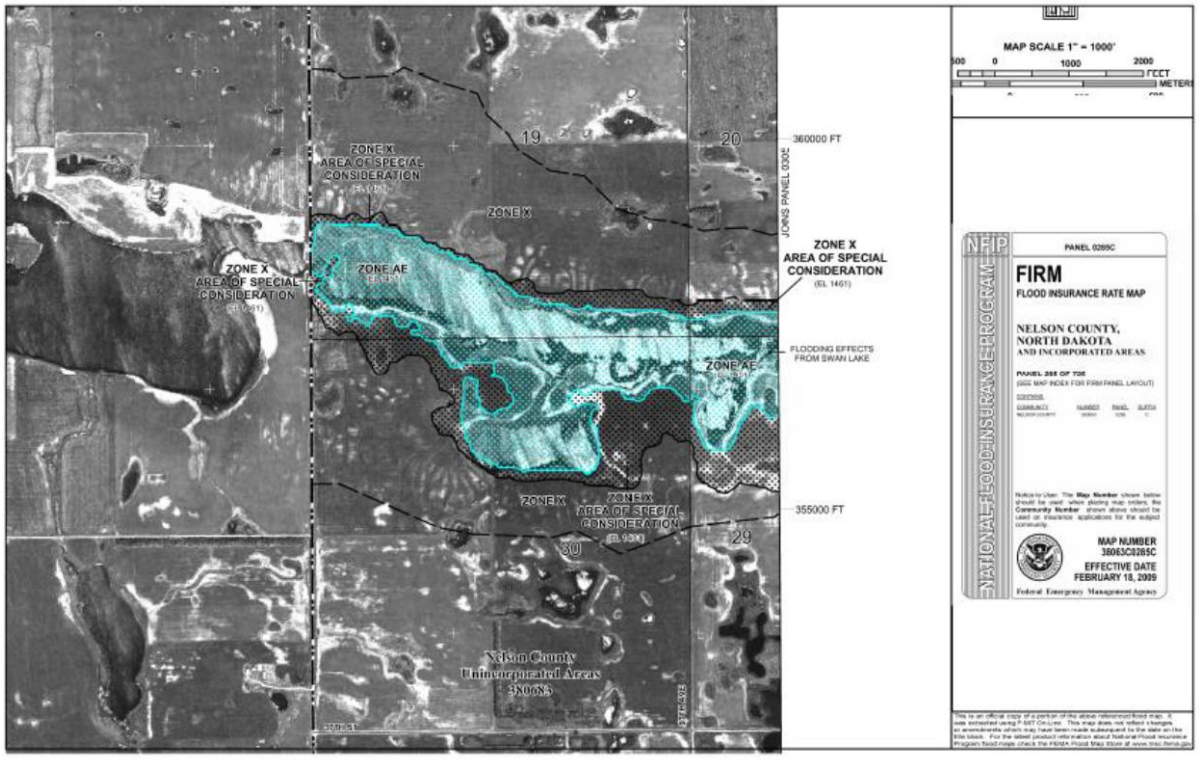
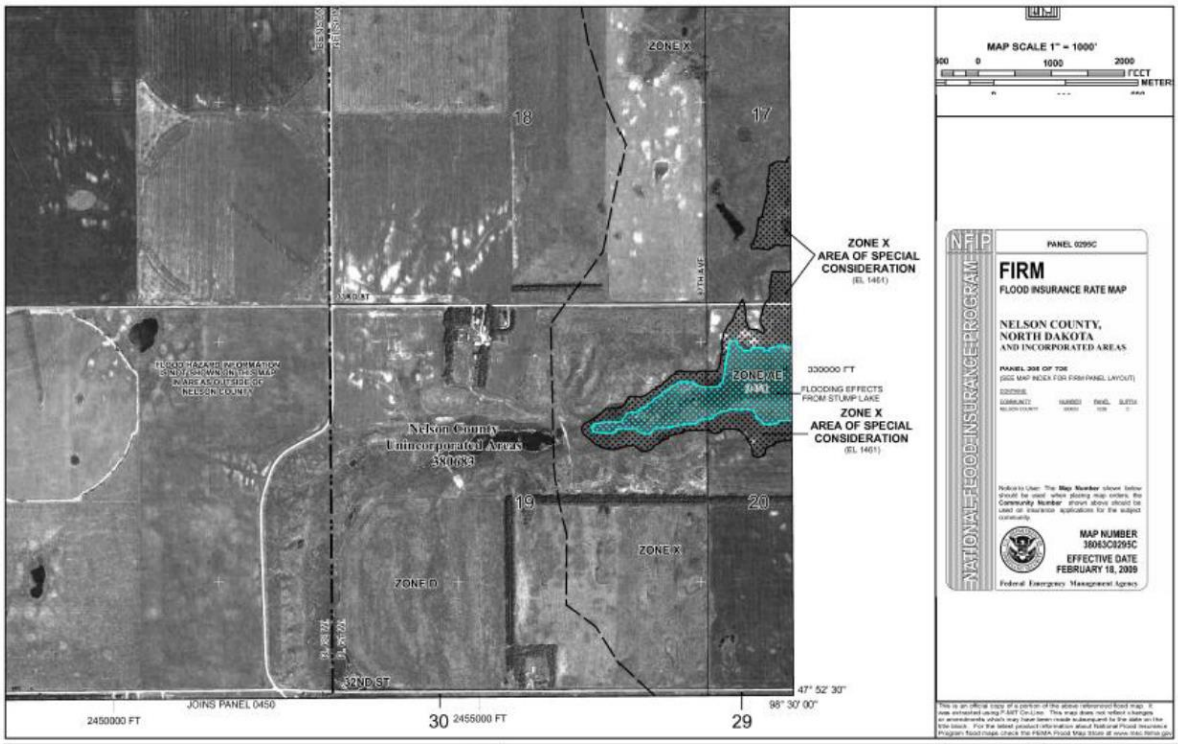
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
NFIP


MAP SCALE 1" = 1000'
FEET
METERS
19
20
360000 FT
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
FLOODING EFFECTS
FROM SWAN LAKE
ZONE AE
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
355000 FT
30
29
Nelson County
Unincorporated Areas
380083
PANEL 0285C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
MAP NUMBER
38063C0285C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency
NATIONAL FLOOD INSURANCE PROGRAM
NFIP


MAP SCALE 1" = 1000'
ZONE X
18
17
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
ZONE AE
330000 FT
FLOODING EFFECTS
FROM STUMP LAKE
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
Nelson County
Unincorporated Areas
380068
19
20
ZONE X
ZONE D
32ND ST
47° 52' 30"
98° 37' 00"
JOINS PANEL 0450
2450000 FT
30 2455000 FT
29
PANEL 0295C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 295 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
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MAP NUMBER
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EFFECTIVE DATE
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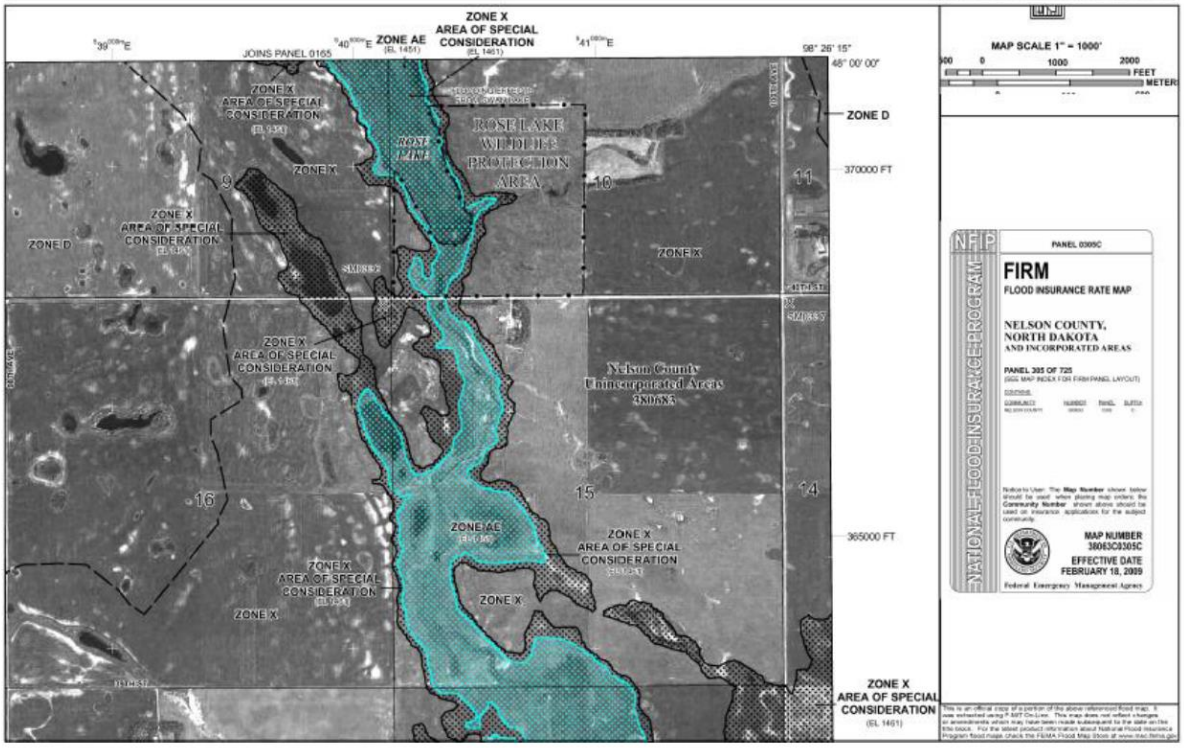
Federal Emergency Management Agency


MAP SCALE 1" = 1000'
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
ZONE AE
(EL 1451)
JOINS PANEL 0165
98° 26' 15"
48° 00' 00"
ZONE D
ROSE LAKE
WILDLIFE
PROTECTION
AREA
370000 FT
ZONE X
ZONE D
ZONE X
Nelson County
Unincorporated Areas
380068
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
365000 FT
ZONE X
ZONE X
PANEL 0305C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 305 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER
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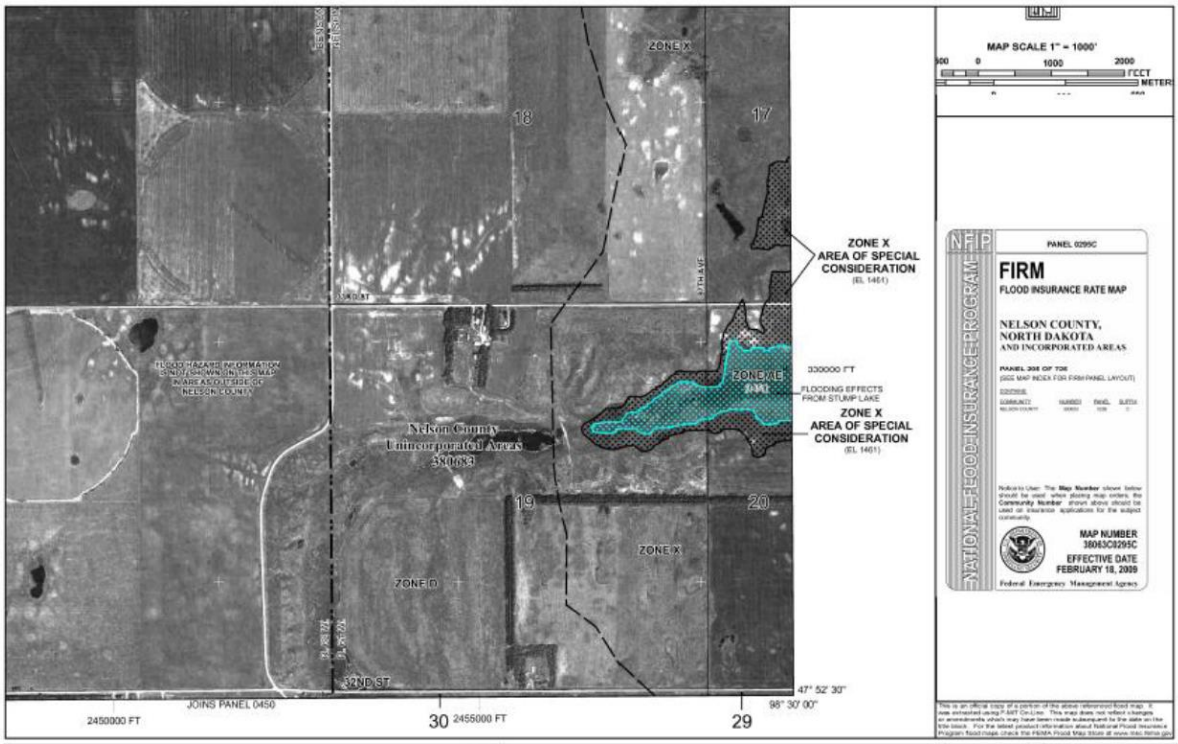
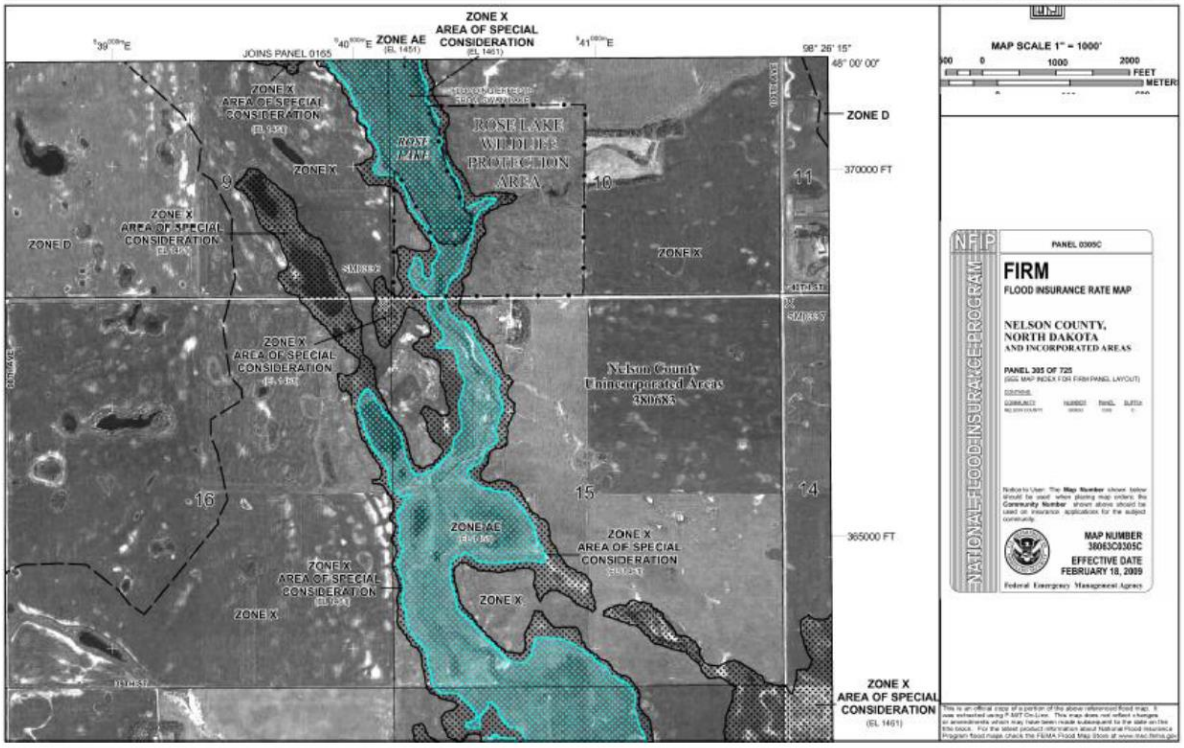
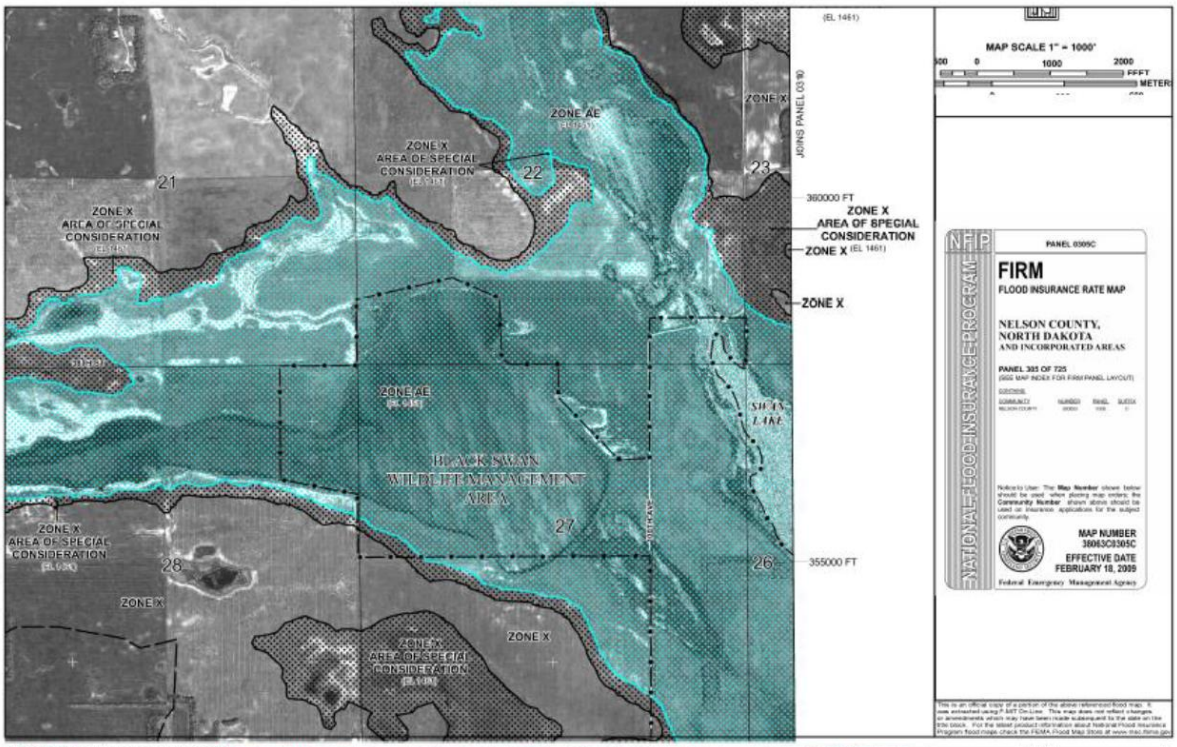
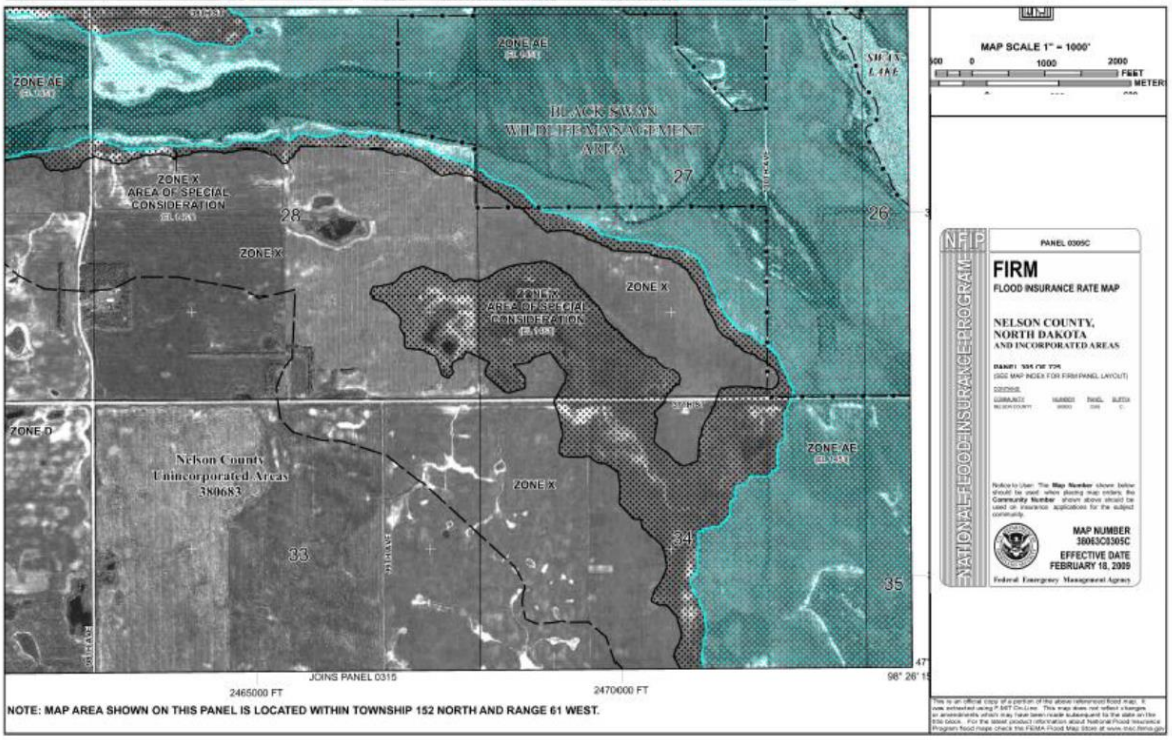
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency

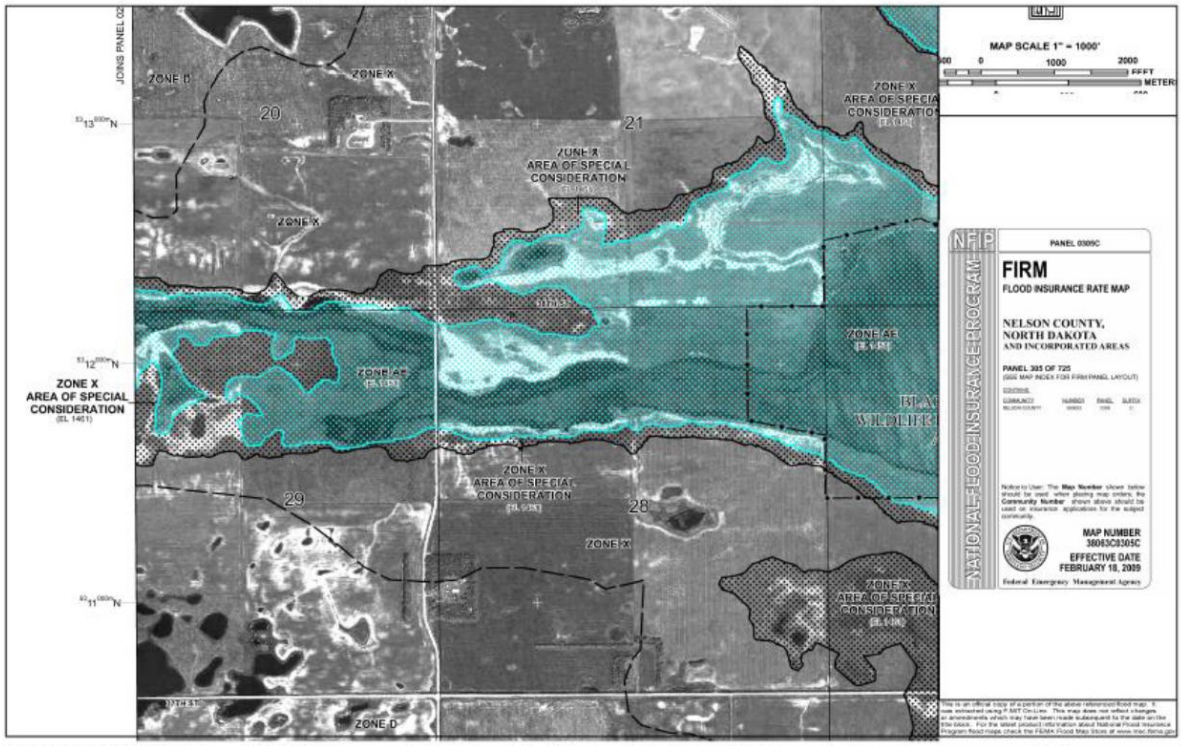

MAP SCALE 1" = 1000'
ZONE X
18
17
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
ZONE AE
330000 FT
FLOODING EFFECTS
FROM STUMP LAKE
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
Nelson County
Unincorporated Areas
380068
19
20
ZONE X
ZONE D
32ND ST
47° 52' 30"
98° 37' 00"
JOINS PANEL 0450
2450000 FT
30 2455000 FT
29
PANEL 0295C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 295 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER
38063C0295C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency

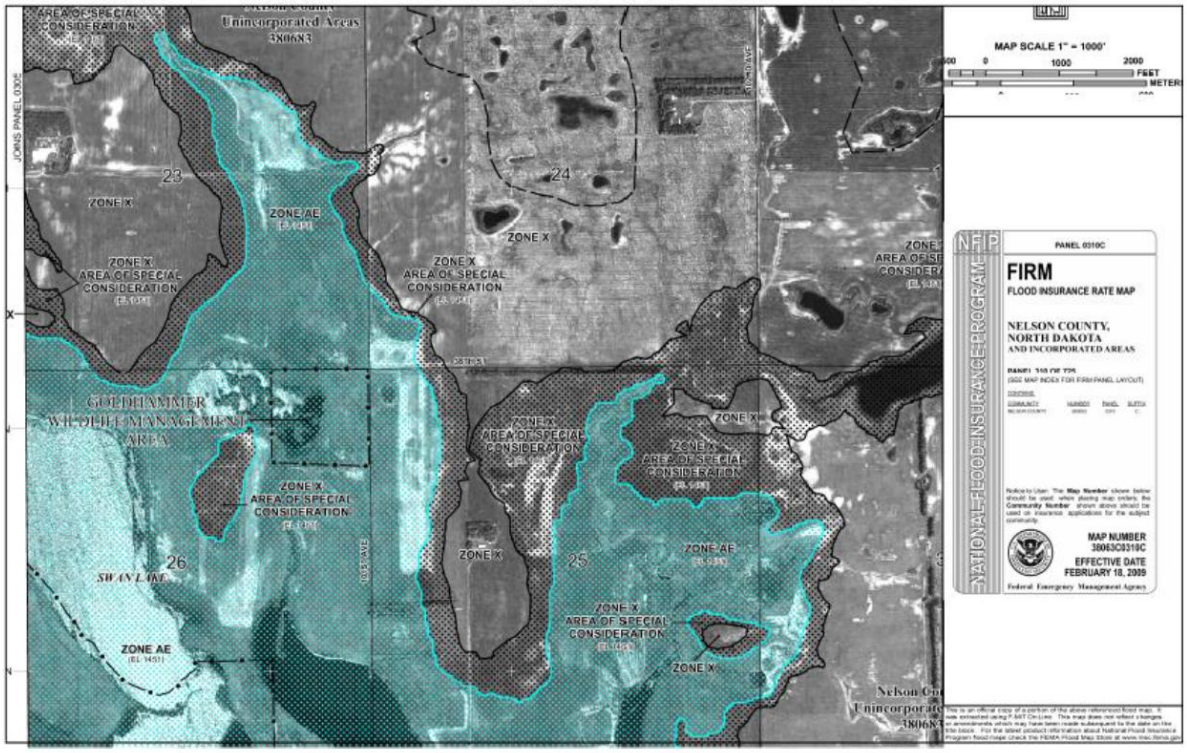

MAP SCALE 1" = 1000'
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
ZONE AE
(EL 1451)
JOINS PANEL 0165
98° 26' 15"
48° 00' 00"
ZONE D
ROSE LAKE
WILDLIFE
PROTECTION
AREA
370000 FT
ZONE X
ZONE D
ZONE X
Nelson County
Unincorporated Areas
380068
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
365000 FT
ZONE X
ZONE X
PANEL 0305C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 305 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
NATIONAL FLOOD INSURANCE PROGRAM
MAP NUMBER
38063C0305C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency

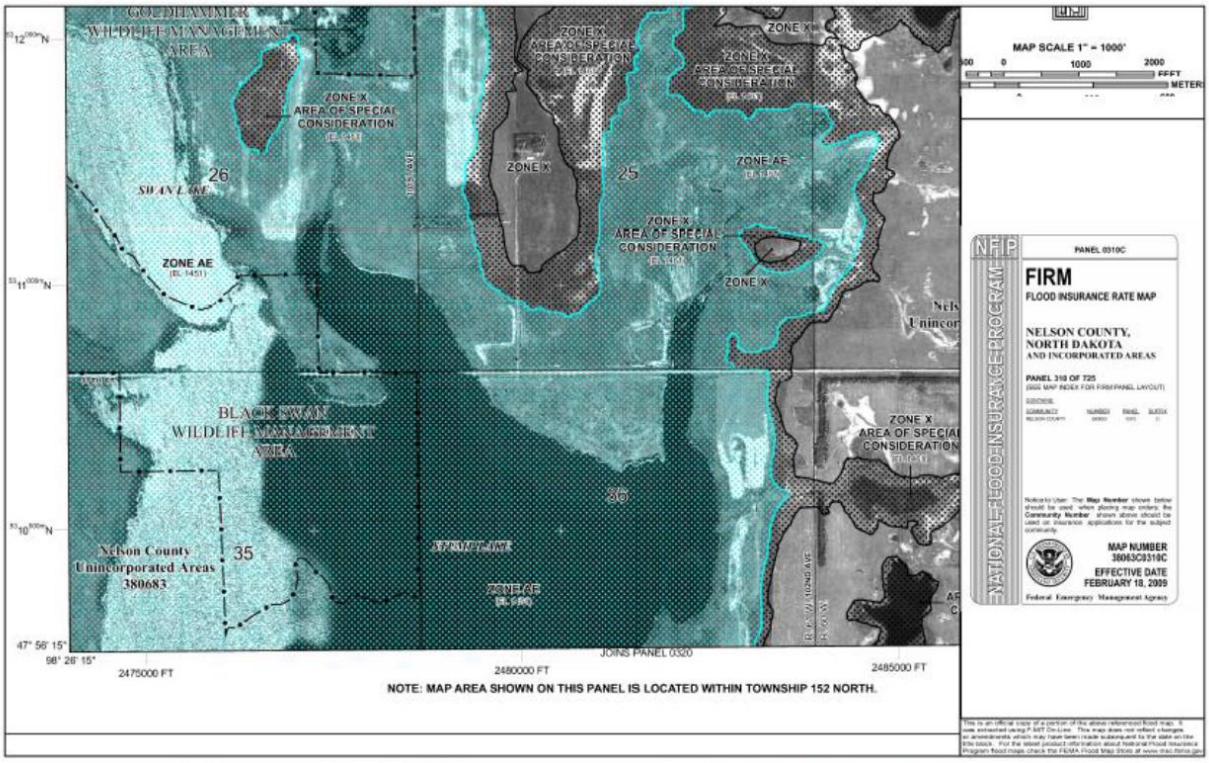


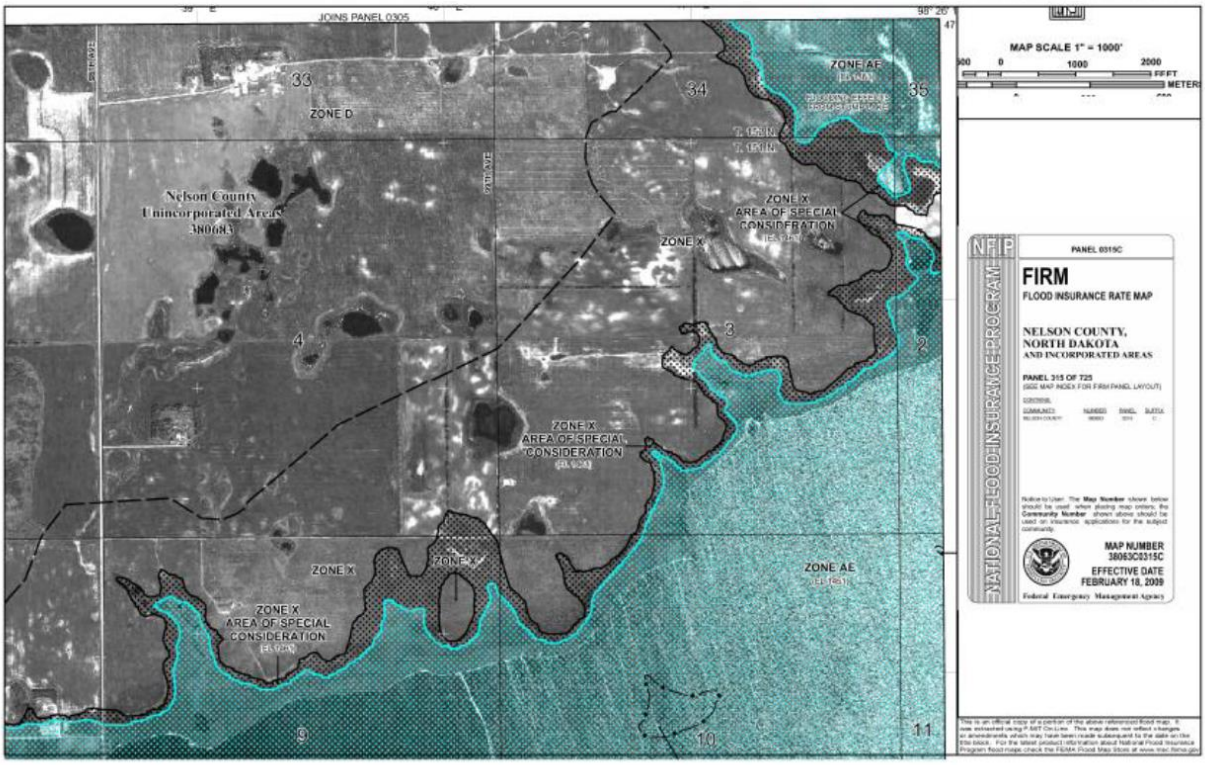


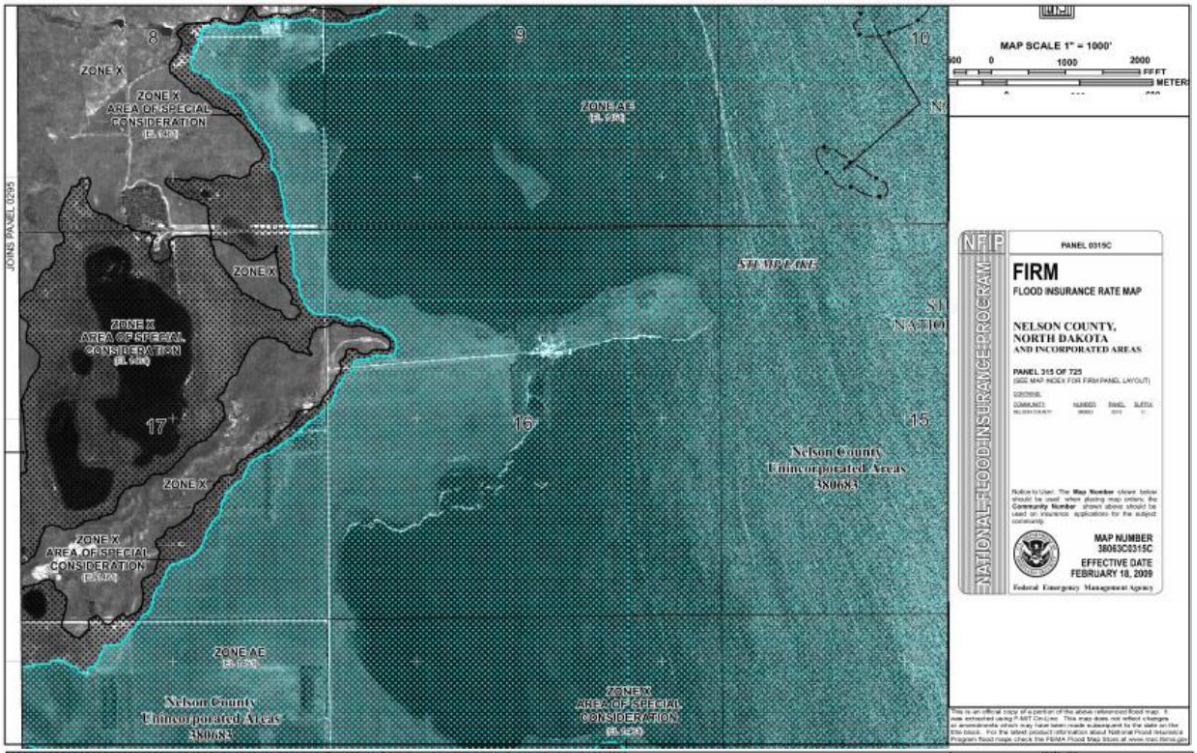
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 152 NORTH AND RANGE 61 WEST.


JOINS PANEL 02
ZONE D
ZONE X
20
21
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
AREA OF SPECIA
CONSIDERATIO
ZONE AE
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
ZONE X
AREA OF SPECIAL
CONSIDERATION
29
28
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE D
MAP SCALE 1" = 1000'
FEET
METERS
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0305C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 305 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0305C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency


JOINS PANEL 0306
AREA OF SPECIAL
CONSIDERATION
Unincorporated Areas
380683
23
24
ZONE X
ZONE AE
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
AREA OF SPECIAL
CONSIDERATION
GOLDHAMMER
WILDLIFE MANAGEMENT
AREA
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
26
SWAN LAKE
ZONE X
25
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE AE
(EL 1451)
ZONE X
MAP SCALE 1" = 1000'
FEET
METERS
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0310C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0310C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency


GOLDEN VIMER WILDLIFE MANAGEMENT AREA
ZONE X AREA OF SPECIAL CONSIDERATION
ZONE X
ZONE AE
SWAN LAKE
26
25
35
36
BLACK SWAN WILDLIFE MANAGEMENT AREA
Nelson County Unincorporated Areas 380683
ZONE AE
JOINS PANEL 0320
2475000 FT
2480000 FT
2485000 FT
47° 56' 15"
98° 28' 15"
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 152 NORTH.
MAP SCALE 1" = 1000'
FEET
METERS
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0310C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 310 OF 725
MAP NUMBER 38063C0310C
EFFECTIVE DATE FEBRUARY 18, 2009
Federal Emergency Management Agency


JOINS PANEL 0305
33
34
35
ZONE D
ZONE AE
Nelson County Unincorporated Areas 380683
ZONE X AREA OF SPECIAL CONSIDERATION
ZONE X
4
3
2
ZONE AE
9
10
11
MAP SCALE 1" = 1000'
FEET
METERS
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0315C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 315 OF 725
MAP NUMBER 38063C0315C
EFFECTIVE DATE FEBRUARY 18, 2009
Federal Emergency Management Agency


MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METERS
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE AE
JOINS PANEL 0295
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
STUMP LAKE
NATIONAL WILDLIFE
REFUGE
Nelson County
Unincorporated Areas
380083
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE AE
Nelson County
Unincorporated Areas
380083
ZONE X
AREA OF SPECIAL
CONSIDERATION
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0315C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 315 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
NELSON COUNTY 380083 0315 C
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
38063C0315C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency
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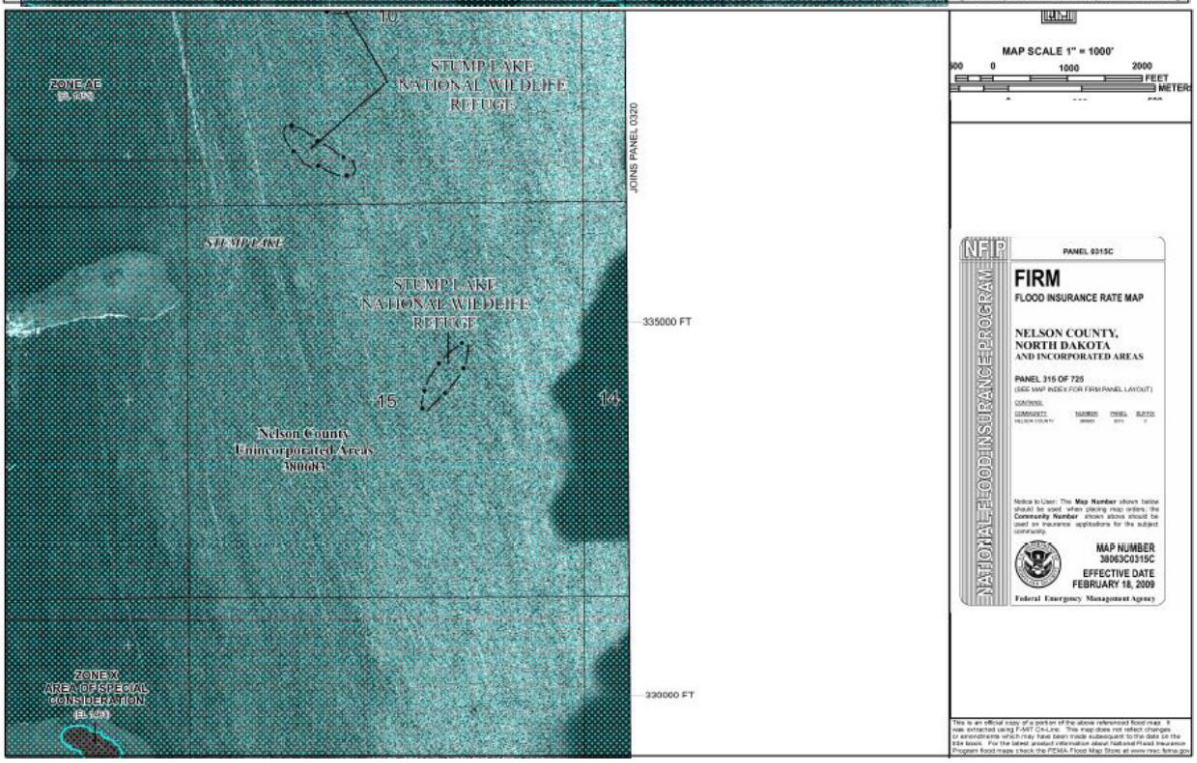
MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METERS
ZONE AE
STUMP LAKE
NATIONAL WILDLIFE
REFUGE
JOINS PANEL 0320
STUMP LAKE
NATIONAL WILDLIFE
REFUGE
335000 FT
Nelson County
Unincorporated Areas
380083
ZONE X
AREA OF SPECIAL
CONSIDERATION
330000 FT
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0315C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 315 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
NELSON COUNTY 380083 0315 C
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
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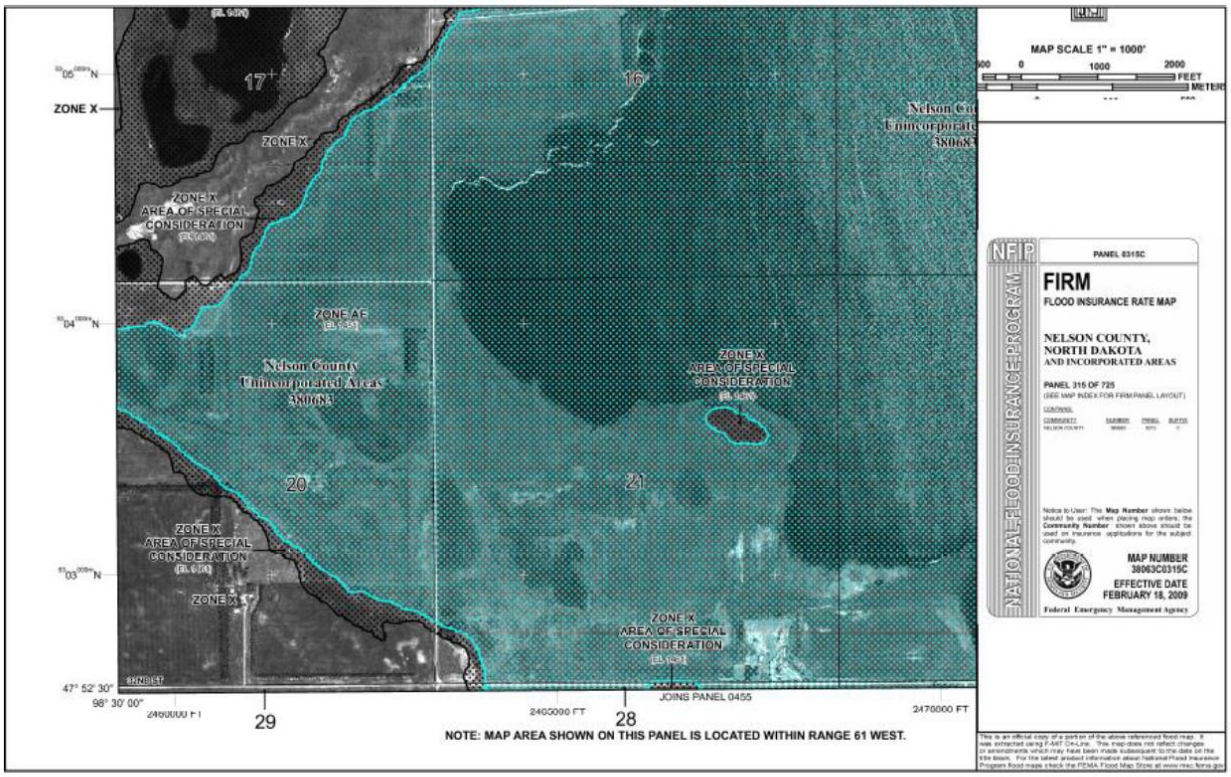
ZONE X
17
16
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE AE
Nelson County
Unincorporated Areas
380083
ZONE X
AREA OF SPECIAL
CONSIDERATION
20
21
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
47° 52' 30"
98° 30' 00"
2460000 FT
29
2460000 FT
28
JOINS PANEL 0455
2470000 FT
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN RANGE 61 WEST.
MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0315C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 315 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
NELSON COUNTY 380083 0315 C
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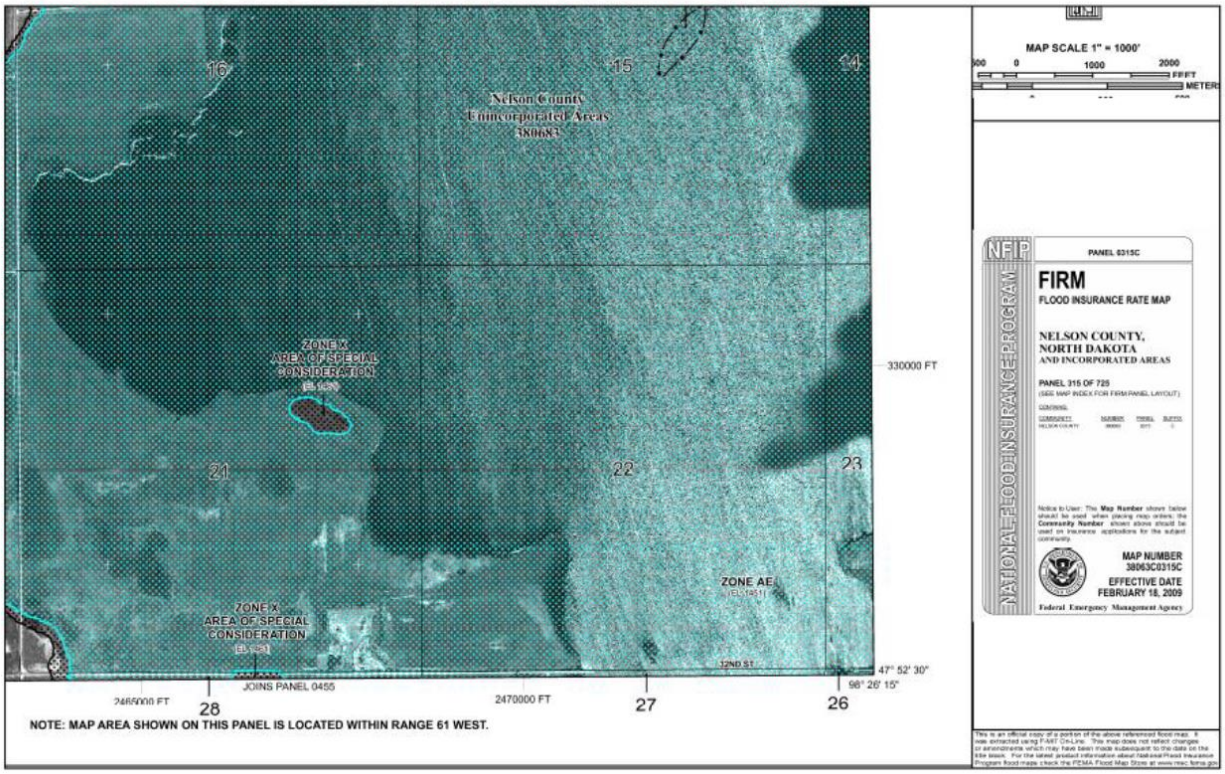
16
15
14
Nelson County
Unincorporated Areas
380083
ZONE X
AREA OF SPECIAL
CONSIDERATION
330000 FT
21
22
23
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
47° 52' 30"
98° 26' 15"
2460000 FT
28
JOINS PANEL 0455
2470000 FT
27
26
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN RANGE 61 WEST.
MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0315C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 315 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
NELSON COUNTY 380083 0315 C
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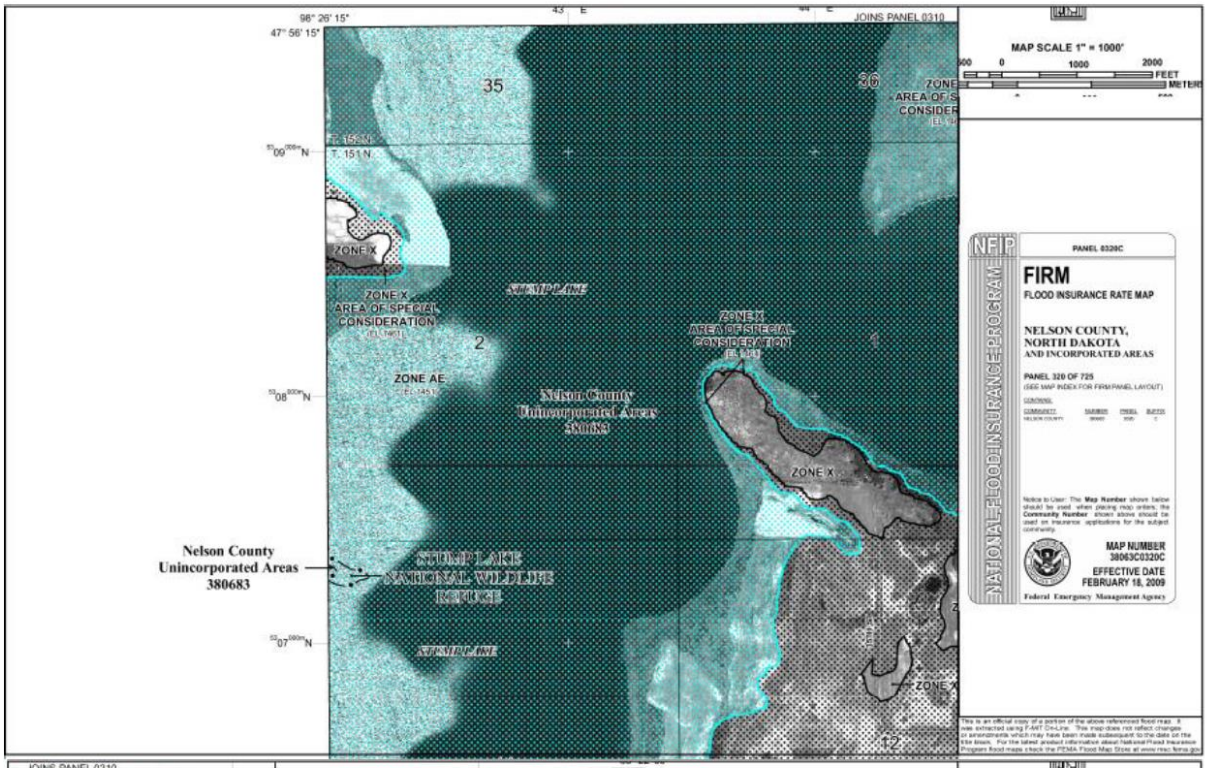
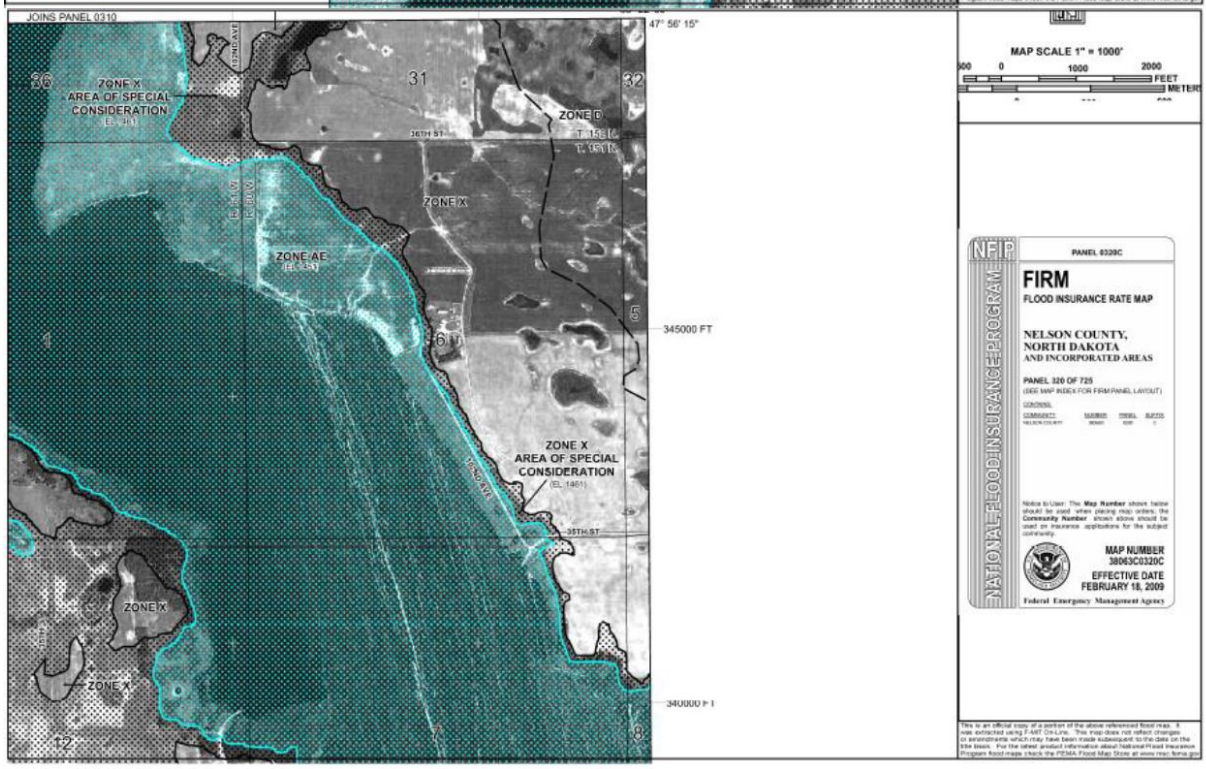
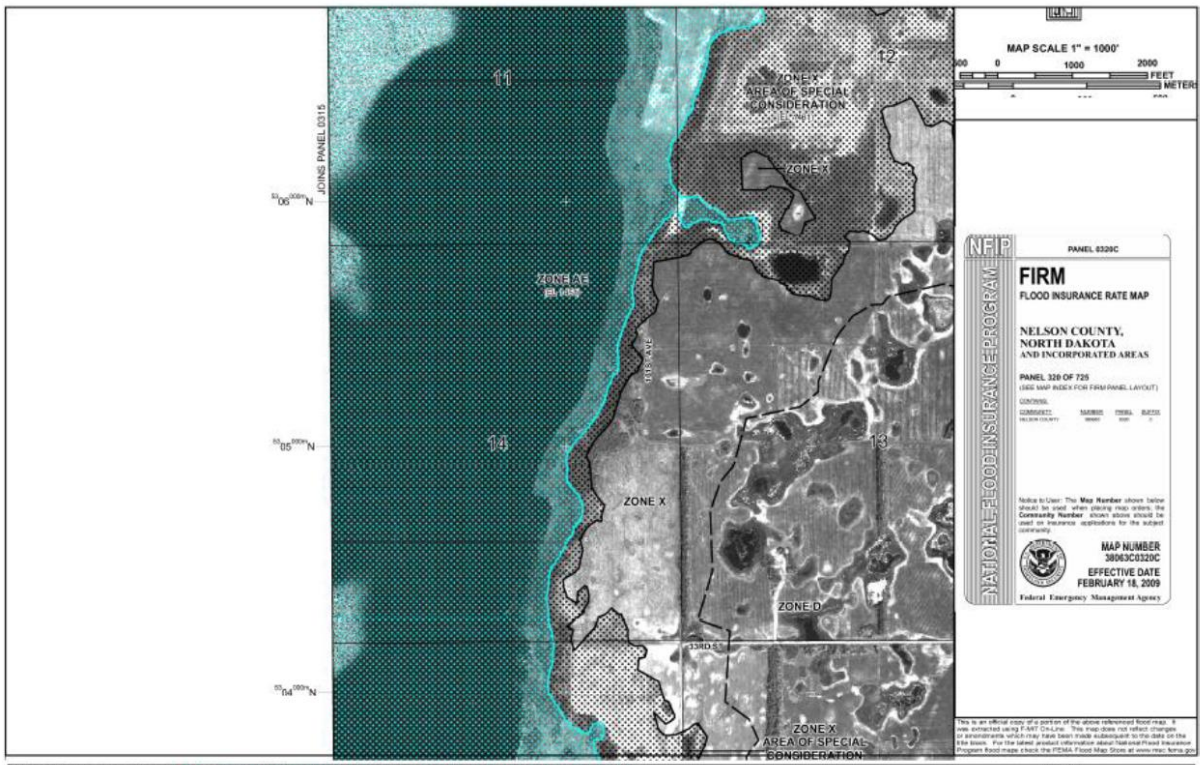
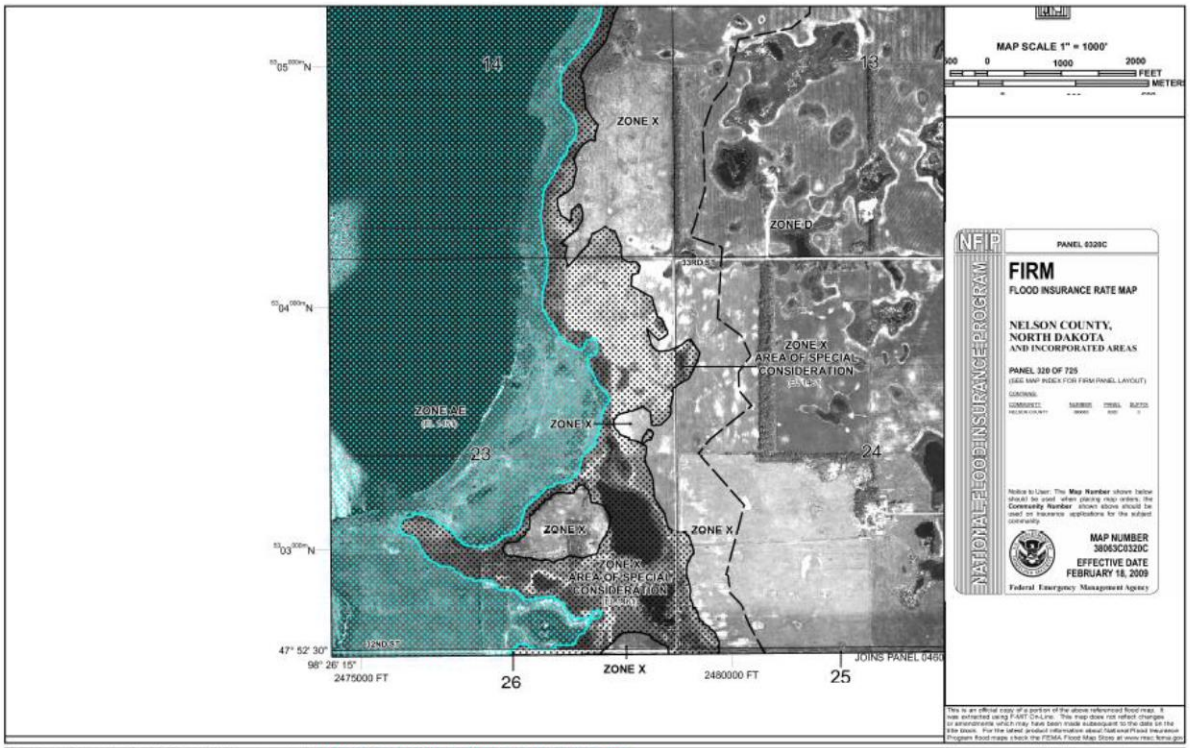

JOINS PANEL 0310
98° 26' 15"
47° 56' 15"
MAP SCALE 1" = 1000'
FEET
METERS
35
36
T. 152 N.
T. 151 N.
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE AE
Nelson County
Unincorporated Areas
380683
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
Nelson County
Unincorporated Areas
380683
MUD LAKE
NATIONAL WILDLIFE
REFUGE
ZONE X
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0320C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 320 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0320C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency


JOINS PANEL 0310
47° 56' 15"
MAP SCALE 1" = 1000'
FEET
METERS
36
ZONE X
AREA OF SPECIAL
CONSIDERATION
31
32
ZONE D
ZONE X
ZONE AE
345000 FT
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
ZONE X
340000 FT
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0320C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 320 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0320C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency


MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
11
12
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
JOINS PANEL 0315
ZONE AE
14
13
ZONE X
ZONE D
33RD S
ZONE X
AREA OF SPECIAL
CONSIDERATION
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0320C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 320 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0320C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency

MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
12
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
JOINS PANEL 0340
ZONE AE
335000 FT
17
13
18
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
ZONE D
330000 FT
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0320C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 320 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0320C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency


MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
14
13
ZONE X
ZONE D
33RD ST
ZONE X
AREA OF SPECIAL CONSIDERATION
ZONE AE
ZONE X
23
24
ZONE X
ZONE X
ZONE X
AREA OF SPECIAL CONSIDERATION
12ND ST
47° 52' 30"
98° 26' 15"
2475000 FT
26
ZONE X
2480000 FT
25
JOINS PANEL 0460
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0320C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 320 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY
NUMBER
PANEL
SUFFIX
NELSON COUNTY
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER
38063C0320C
EFFECTIVE DATE
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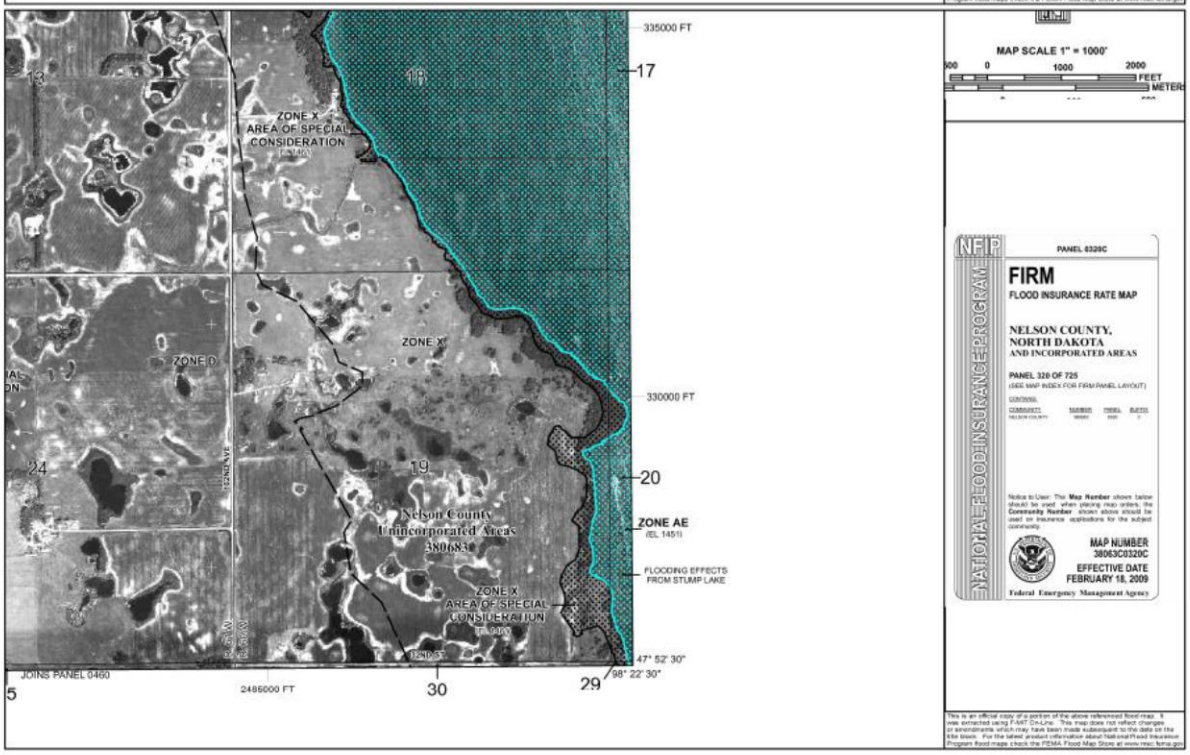
MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
335000 FT
17
18
13
ZONE X
AREA OF SPECIAL CONSIDERATION
ZONE D
ZONE X
330000 FT
24
19
20
Nelson County
Unincorporated Areas
380683
ZONE AE
(EL 1451)
FLOODING EFFECTS FROM STUMP LAKE
ZONE X
AREA OF SPECIAL CONSIDERATION
12ND ST
47° 52' 30"
98° 22' 30"
JOINS PANEL 0460
5
2485000 FT
30
29
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0320C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 320 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY
NUMBER
PANEL
SUFFIX
NELSON COUNTY
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
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38063C0320C
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Federal Emergency Management Agency
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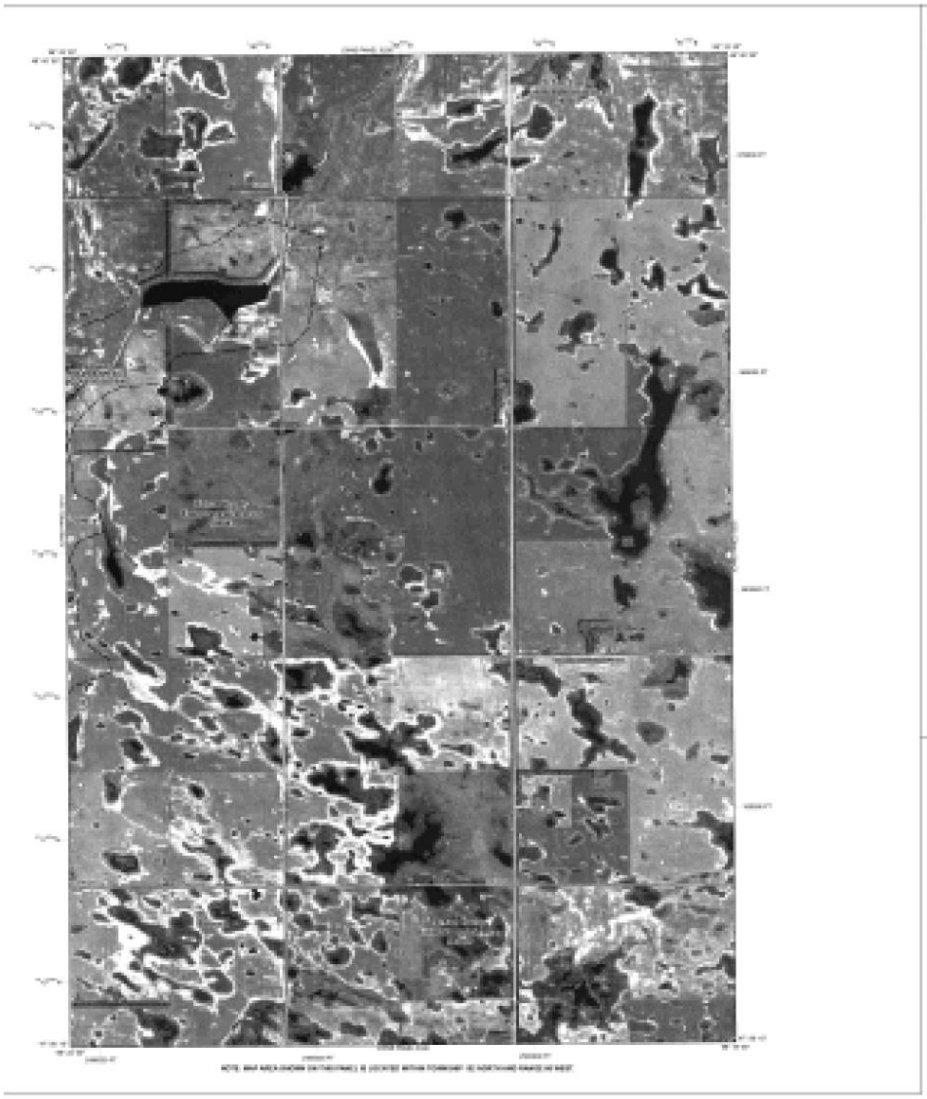


NOTE: MAP AREA SHOWN ENTIRELY IN LOCKED WITHIN TOWNSHIP 10 NORTH AND RANGE 56 WEST

LEGEND

PANEL 0000C

FIRM

FLOOD INSURANCE RATE MAP

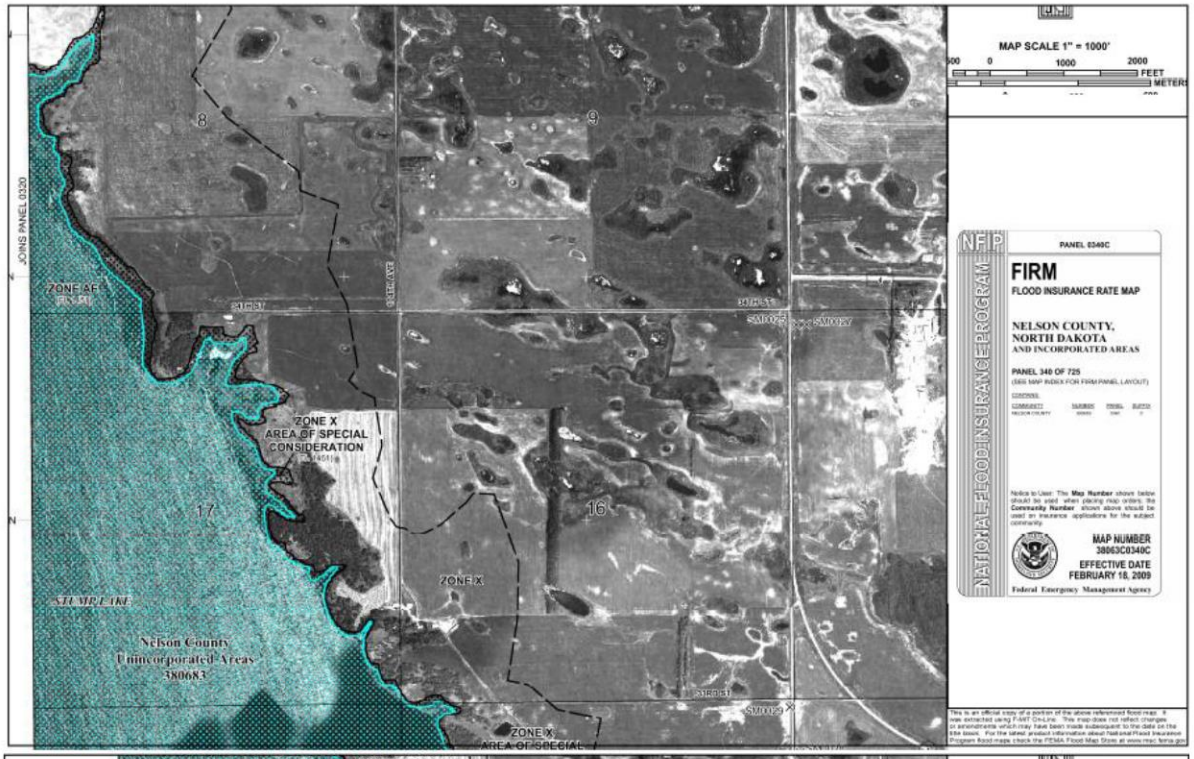
STEARNS COUNTY, NORTH DAKOTA AND INCORPORATED AREAS

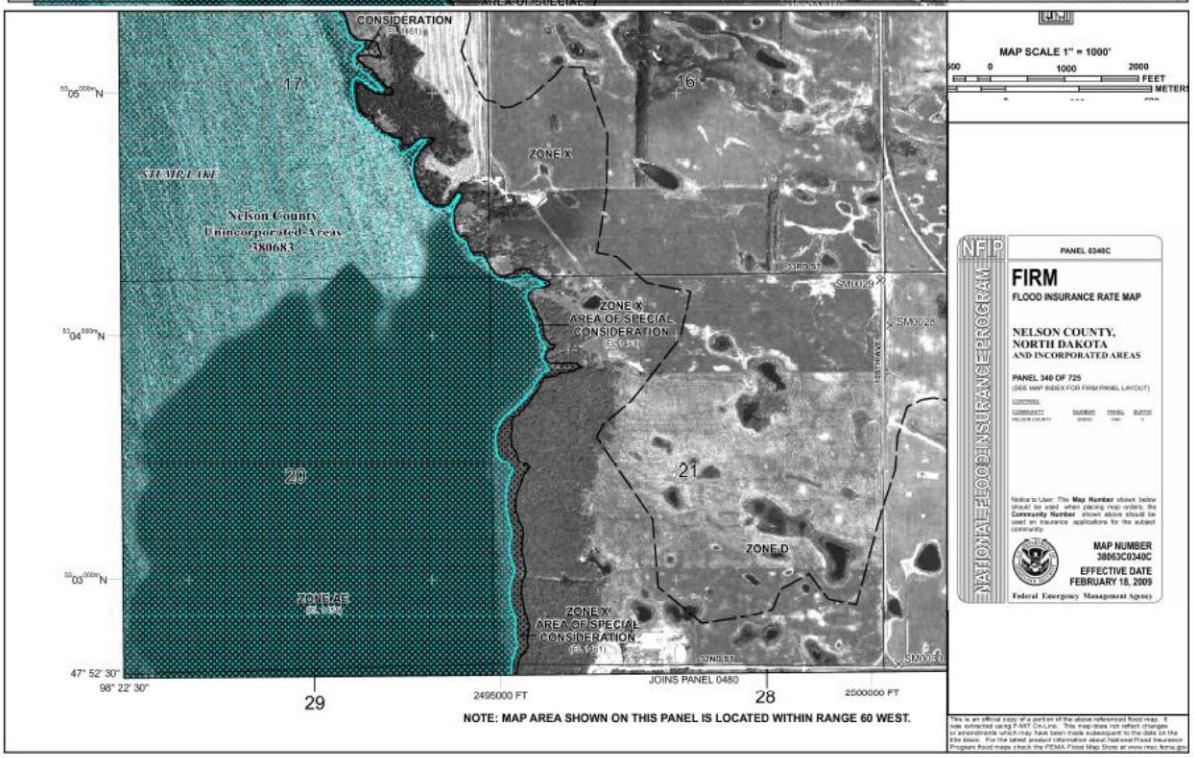
PANEL 0000 OF 0000

COMMUNITY NUMBER | PANEL NUMBER | SUFFIX

MAP NUMBER
00000000C
EFFECTIVE DATE
FEBRUARY 15, 2000

Federal Emergency Management Agency


MAP SCALE 1" = 1000'
500 0 1000 2000
FEET
METERS
JOINS PANEL 0320
8
9
17
16
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
STATE LINE
Nelson County
Unincorporated Areas
380683
ZONE X
AREA OF SPECIAL
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0340C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 340 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0340C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency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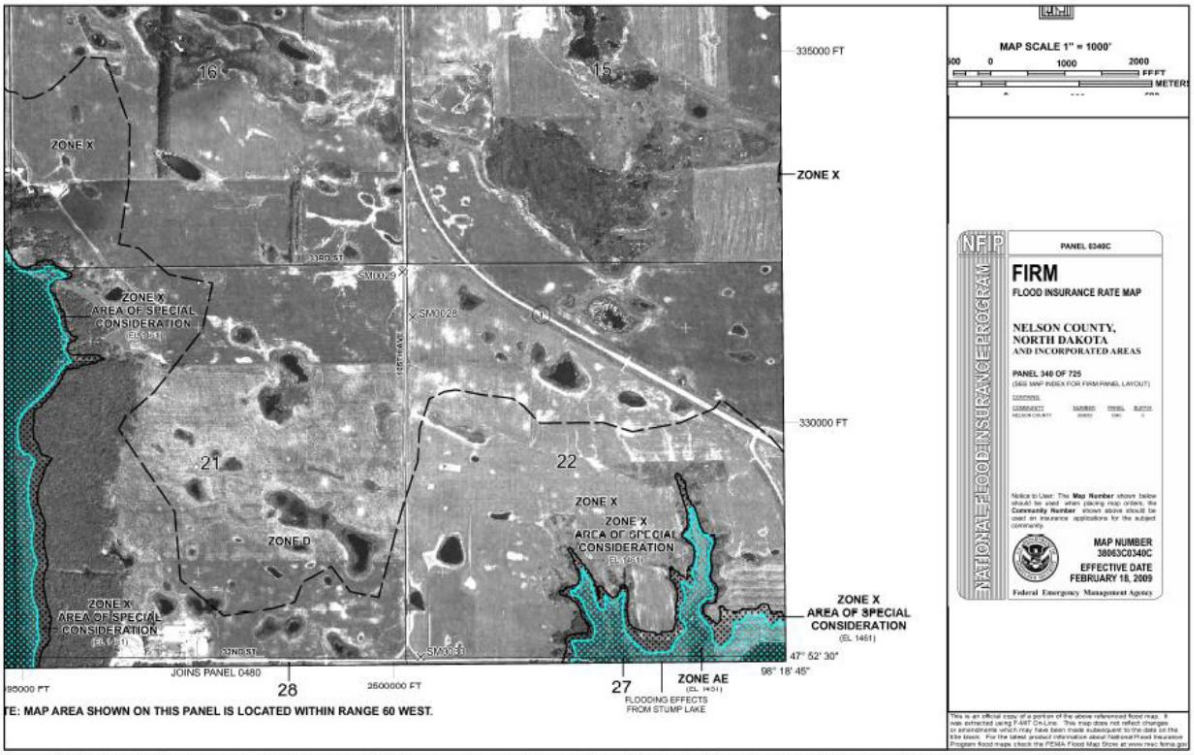
FEET
METERS
CONSIDERATION
17
16
ZONE X
STATE LINE
Nelson County
Unincorporated Areas
380683
ZONE X
AREA OF SPECIAL
CONSIDERATION
20
21
ZONE D
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
53°05'00"N
53°04'00"N
53°03'00"N
47° 52' 30"
98° 22' 30"
29
2495000 FT
JOINS PANEL 0480
28
2500000 FT
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN RANGE 60 WEST.
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0340C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 340 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0340C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency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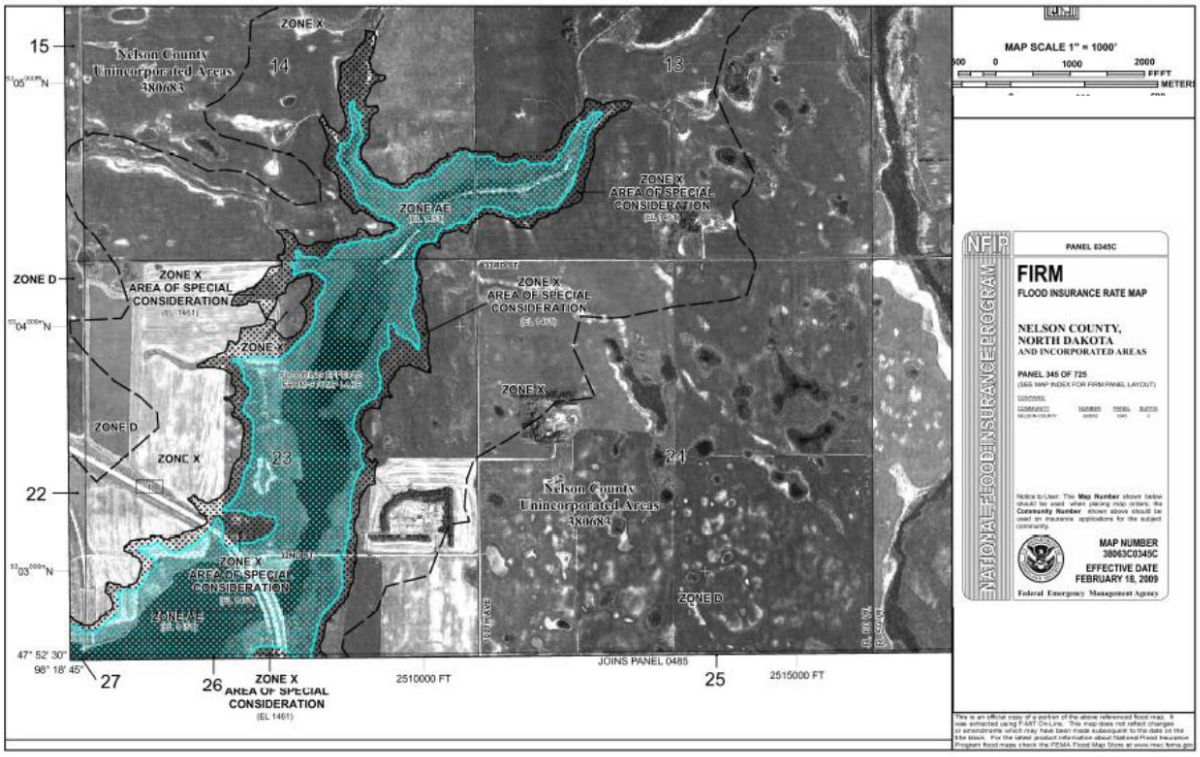
FEET
METERS
335000 FT
330000 FT
ZONE X
ZONE X
AREA OF SPECIAL CONSIDERATION
ZONE D
ZONE AE
FLOODING EFFECTS FROM STUMP LAKE
JOINS PANEL 0480
2500000 FT
47° 52' 30"
98° 18' 45"
TE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN RANGE 60 WEST.
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0340C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 340 OF 725
MAP NUMBER 38063C0340C
EFFECTIVE DATE FEBRUARY 18, 2009
Federal Emergency Management Agency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FEET
METERS
Nelson County Unincorporated Areas
ZONE X
ZONE AE
ZONE X AREA OF SPECIAL CONSIDERATION
ZONE D
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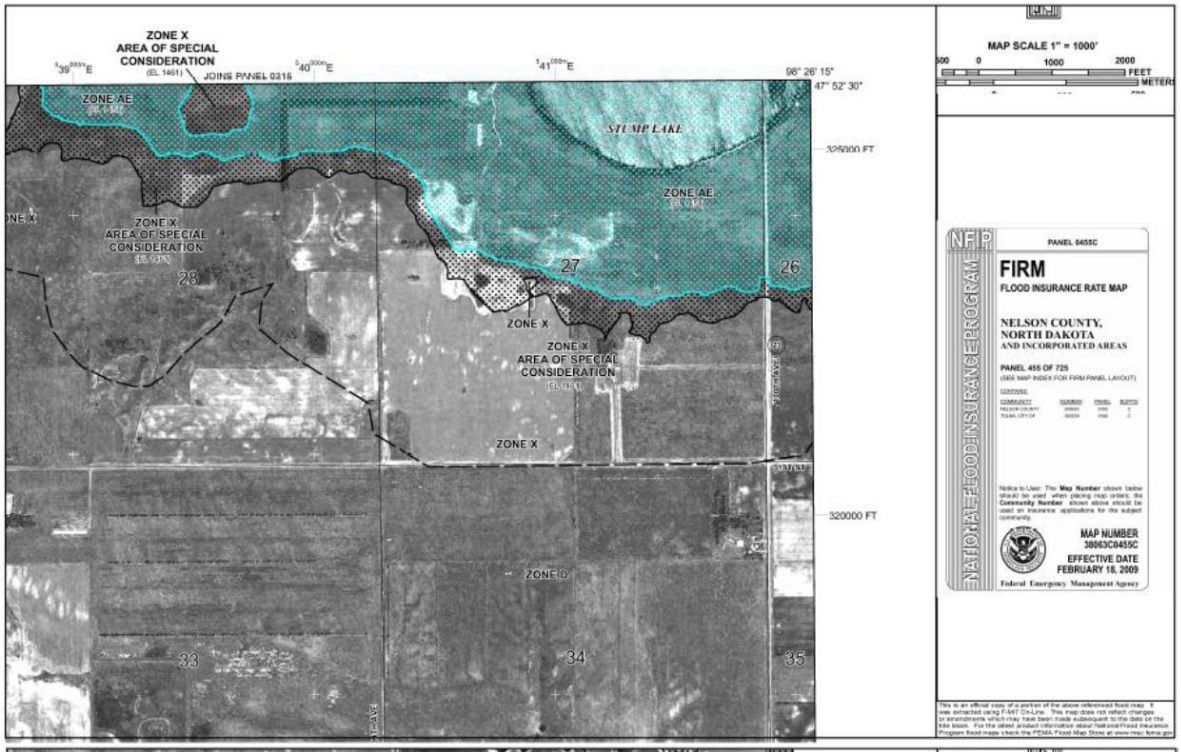
2510000 FT
2515000 FT
47° 52' 30"
98° 18' 45"
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0345C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 345 OF 725
MAP NUMBER 38063C0345C
EFFECTIVE DATE FEBRUARY 18, 2009
Federal Emergency Management Agency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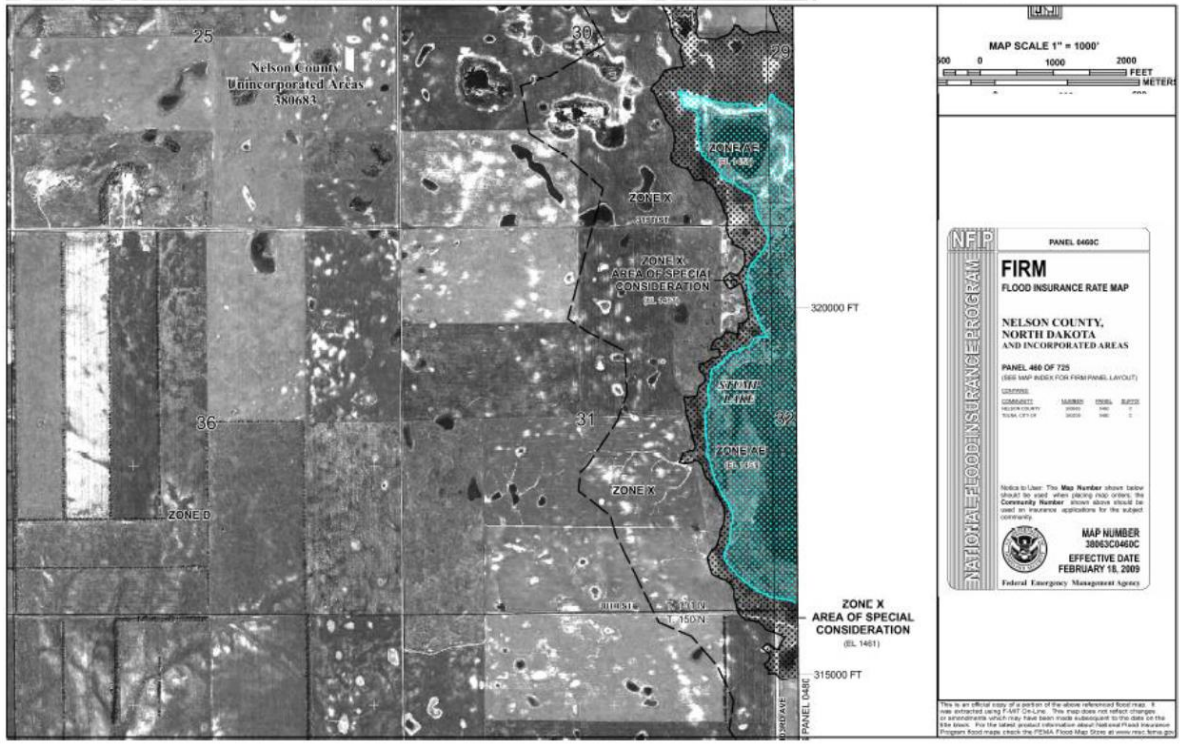
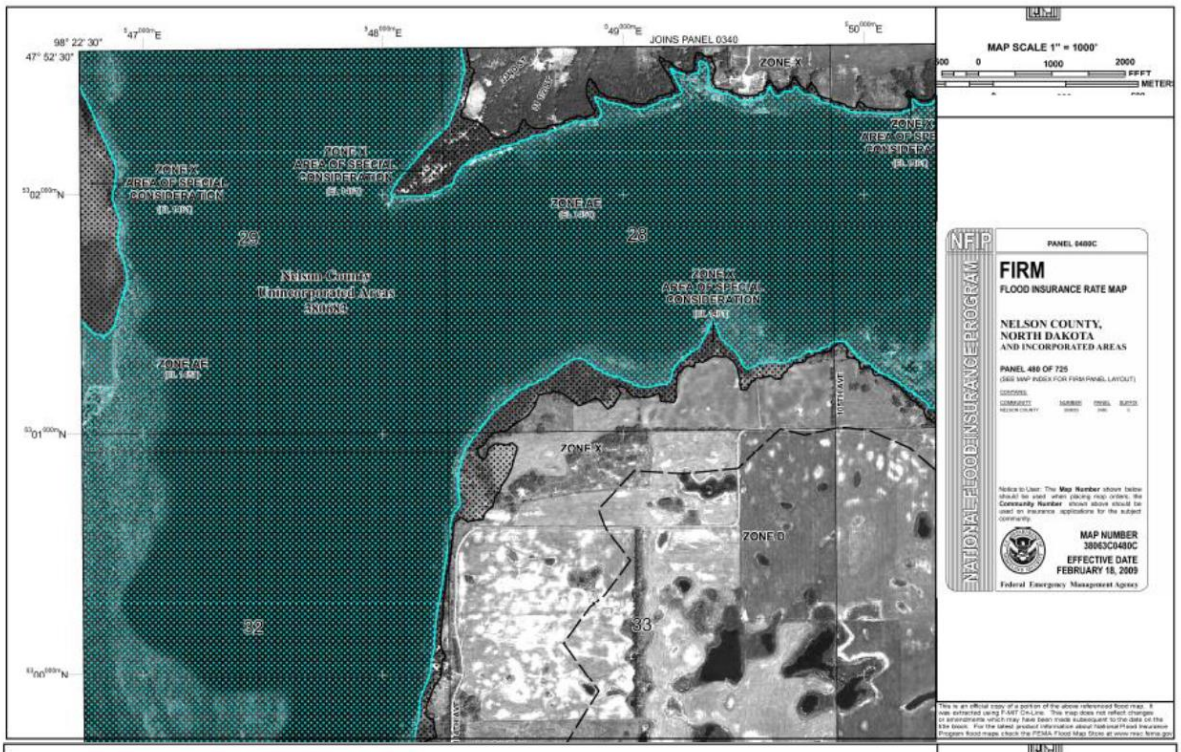
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
JOINS PANEL 0316
96° 26' 15"
47° 52' 30"
ZONE AE
STUMP LAKE
325000 FT
ZONE AE
ZONE X
AREA OF SPECIAL
CONSIDERATION
28
27
26
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE X
320000 FT
ZONE D
33
34
35
MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0455C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 455 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0455C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency


25
Nelson County
Unincorporated Areas
380683
30
29
ZONE AE
ZONE X
ZONE X
AREA OF SPECIAL
CONSIDERATION
320000 FT
STUMP LAKE
36
31
32
ZONE AE
ZONE X
ZONE D
T. 150 N.
ZONE X
AREA OF SPECIAL
CONSIDERATION
(EL 1461)
315000 FT
MAP SCALE 1" = 1000'
0
1000
2000
FEET
METERS
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0460C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 460 OF 725
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
MAP NUMBER
38063C0460C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency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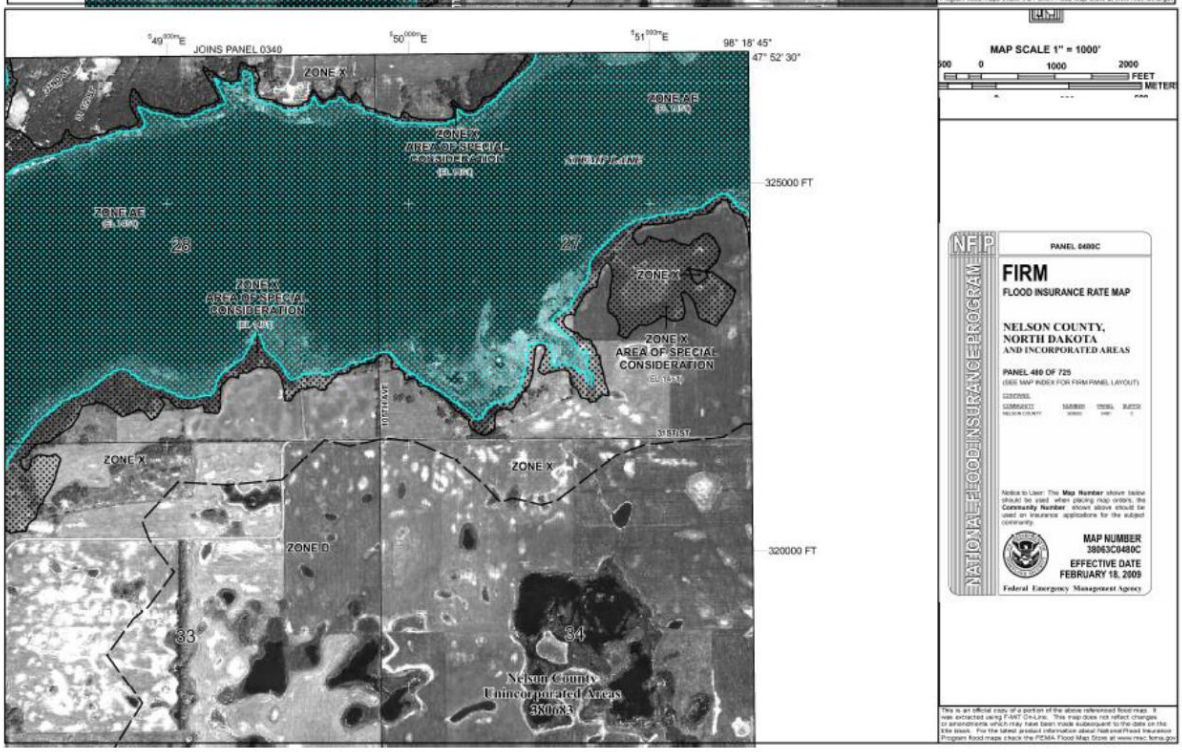
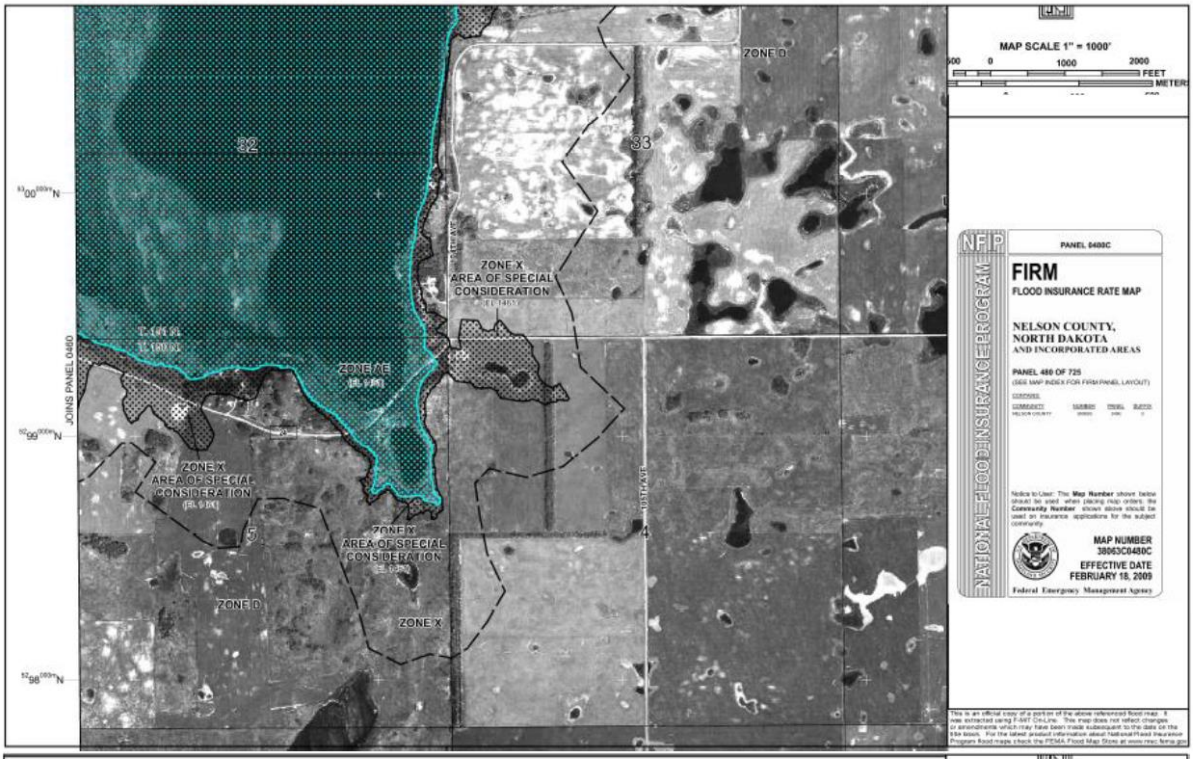
ZONE X AREA OF SPECIAL CONSIDERATION
ZONE AE
29
28
Nelson County Unincorporated Areas
ZONE X
ZONE D
32
33
MAP SCALE 1" = 1000'
FEET
METERS
PANEL 0480C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 480 OF 725
MAP NUMBER 38063C0480C
EFFECTIVE DATE FEBRUARY 18, 2009
NATIONAL FLOOD INSURANCE PROGRAM
Federal Emergency Management Agency


JOINS PANEL 0340
98° 18' 45"
47° 52' 30"
ZONE X
ZONE AE
ZONE X AREA OF SPECIAL CONSIDERATION
325000 FT
28
27
ZONE X
ZONE D
320000 FT
33
34
Nelson County Unincorporated Areas
MAP SCALE 1" = 1000'
FEET
METERS
PANEL 0480C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY, NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 480 OF 725
MAP NUMBER 38063C0480C
EFFECTIVE DATE FEBRUARY 18, 2009
NATIONAL FLOOD INSURANCE PROGRAM
Federal Emergency Management Agency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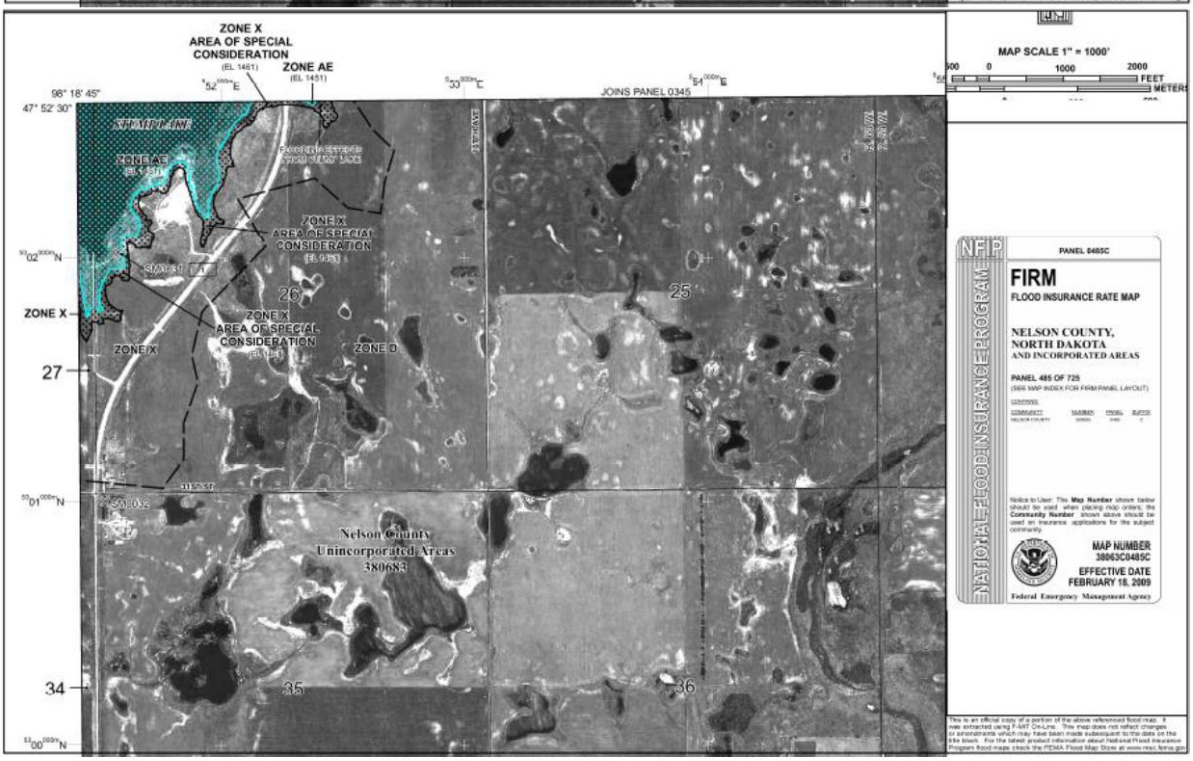
FEET
METERS
ZONE D
ZONE X
AREA OF SPECIAL
CONSIDERATION
ZONE AE
JOINS PANEL 0480
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0480C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 480 OF 725
MAP NUMBER
38063C0480C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency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AREA OF SPECIAL
CONSIDERATION
(EL 1461)
ZONE AE
(EL 1451)
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MAP SCALE 1" = 1000'
FEET
METERS
ZONE X
ZONE D
Nelson County
Unincorporated Areas
380683
NFIP
NATIONAL FLOOD INSURANCE PROGRAM
PANEL 0485C
FIRM
FLOOD INSURANCE RATE MAP
NELSON COUNTY,
NORTH DAKOTA
AND INCORPORATED AREAS
PANEL 485 OF 725
MAP NUMBER
38063C0485C
EFFECTIVE DATE
FEBRUARY 18, 2009
Federal Emergency Management Agency

Appendix F: Approval Documentation

NELSON COUNTY
2015 MULTI-HAZARD MITIGATION PLAN
RESOLUTION OF ADOPTION

WHEREAS, Nelson County has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, Nelson County recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the county; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the county and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the Nelson County Commission; and

NOW, THEREFORE, BE IT RESOLVED that the County of Nelson, North Dakota does hereby adopt the 2015 Nelson County Multi-Hazard Mitigation Plan.

Adopted this 4th day of June, 2015.

Odell Flaagan

Odell Flaagan, Chairman
Nelson County Commission

W. J. Davidson

W. J. Davidson, Auditor
Nelson County

RESOLUTION

ADOPTING THE 2015 NELSON COUNTY MULTI-HAZARD MITIGATION PLAN FOR THE **CITY OF ANETA, ND**

WHEREAS, the City of Aneta has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, the City of Aneta recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the City; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the City and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management and the City of Aneta will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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 Aneta, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the Aneta City Council; and

NOW, THEREFORE, BE IT RESOLVED by the **City of Aneta**, North Dakota that the 2015 Nelson County Multi-Hazard Mitigation Plan as approved by FEMA is hereby **adopted** by the City of Aneta as the City's Multi-Hazard Mitigation Plan.

Adopted this 1st day of June, 2015.

Todd Whitman Mayor

Todd Whitman, Mayor

Judy Rusten

Judy Rusten, Auditor

RESOLUTION

ADOPTING THE 2015 NELSON COUNTY MULTI-HAZARD
MITIGATION PLAN FOR THE **CITY OF LAKOTA, ND**

WHEREAS, the City of Lakota has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, the City of Lakota recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the City; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the City and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management and the City of Lakota will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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 Lakota, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the Lakota City Council; and

NOW, THEREFORE, BE IT RESOLVED by the **City of Lakota**, North Dakota that the 2015 Nelson County Multi-Hazard Mitigation Plan as approved by FEMA is hereby **adopted** by the City of Lakota as the City's Multi-Hazard Mitigation Plan.

Adopted this 1st day of June, 2015.

Jeff Russo, Mayor

Amie Vasichek, Auditor

RESOLUTION

ADOPTING THE 2015 NELSON COUNTY MULTI-HAZARD MITIGATION PLAN FOR THE **CITY OF MCVILLE, ND**

WHEREAS, the City of McVille has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, the City of McVille recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the City; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the City and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management and the City of McVille will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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 McVille, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the McVille City Council; and

NOW, THEREFORE, BE IT RESOLVED by the **City of McVille**, North Dakota that the 2015 Nelson County Multi-Hazard Mitigation Plan as approved by FEMA is hereby **adopted** by the City of McVille as the City's Multi-Hazard Mitigation Plan.

Adopted this 10 day of June, 2015.

Douglas Stein

Douglas Stein, Mayor

Renae Arneson

Renae Arneson, Auditor

RESOLUTION

ADOPTING THE 2015 NELSON COUNTY MULTI-HAZARD
MITIGATION PLAN FOR THE **CITY OF MICHIGAN, ND**

WHEREAS, the City of Michigan has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, the City of Michigan recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the City; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the City and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management and the City of Michigan will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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 Michigan, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the Michigan City Council; and

NOW, THEREFORE, BE IT RESOLVED by the **City of Michigan**, North Dakota that the 2015 Nelson County Multi-Hazard Mitigation Plan as approved by FEMA is hereby **adopted** by the City of Michigan as the City's Multi-Hazard Mitigation Plan.

Adopted this 1st day of June, 2015.

Lauri Rysavy

Lauri Rysavy, Mayor

Robbyn Maresh

Robbyn Maresh, Auditor

RESOLUTION

ADOPTING THE 2015 NELSON COUNTY MULTI-HAZARD
MITIGATION PLAN FOR THE **CITY OF PEKIN, ND**

WHEREAS, the City of Pekin has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, the City of Pekin recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the City; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the City and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management and the City of Pekin will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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 Pekin, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the Pekin City Council; and

NOW, THEREFORE, BE IT RESOLVED by the **City of Pekin**, North Dakota that the 2015 Nelson County Multi-Hazard Mitigation Plan as approved by FEMA is hereby **adopted** by the City of Pekin as the City's Multi-Hazard Mitigation Plan.

Adopted this 1st day of June, 2015.

Duane Avdem

Duane Avdem, Mayor

Jane Hanson

Jane Hanson, Auditor

RESOLUTION

ADOPTING THE 2015 NELSON COUNTY MULTI-HAZARD MITIGATION PLAN FOR THE **CITY OF PETERSBURG, ND**

WHEREAS, the City of Petersburg has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, the City of Petersburg recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the City; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the City and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management and the City of Petersburg will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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 Petersburg, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the Petersburg City Council; and

NOW, THEREFORE, BE IT RESOLVED by the **City of Petersburg**, North Dakota that the 2015 Nelson County Multi-Hazard Mitigation Plan as approved by FEMA is hereby **adopted** by the City of Petersburg as the City's Multi-Hazard Mitigation Plan.

Adopted this 1 day of June, 2015.

Milton Schmidt, Mayor

James Schmidt, Auditor

RESOLUTION

ADOPTING THE 2015 NELSON COUNTY MULTI-HAZARD MITIGATION PLAN FOR THE **CITY OF TOLNA, ND**

WHEREAS, the City of Tolna has been and continues to be committed to the protection of life, property, and the environment from natural, technological, and human-caused hazards; and

WHEREAS, the City of Tolna recognizes the threat that natural, technological, or human-caused hazards pose to people and property within the City; and

WHEREAS, the 2015 Nelson County Multi-Hazard Mitigation Plan is the result of an extensive planning effort coordinated by Nelson County Emergency Management in cooperation with governmental and non-governmental stakeholders to develop a community specific mitigation plan which identifies hazards that have the potential to impact the City and establishes mitigation strategies to address these hazards; and

WHEREAS, Nelson County Emergency Management and the City of Tolna will coordinate implementation of the plan and continue to engage stakeholders in the review and update of the plan; 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 Tolna, Nelson County, ND Department of Emergency Services, and Federal Emergency Management Agency Regional VIII officials have reviewed the 2015 Nelson County Multi-Hazard Mitigation Plan and have approved it contingent upon this official adoption of the plan by the Tolna City Council; and

NOW, THEREFORE, BE IT RESOLVED by the **City of Tolna**, North Dakota that the 2015 Nelson County Multi-Hazard Mitigation Plan as approved by FEMA is hereby **adopted** by the City of Tolna as the City's Multi-Hazard Mitigation Plan.

Adopted this 1st day of June, 2015.

Ken Quam

Ken Quam, Mayor

Vicky Engen

Vicky Engen, Auditor