

**2015 Barnes County
Multi-Jurisdictional
Multi-Hazard
Mitigation Plan**



2015 Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan

Barnes County, North Dakota



Plan Development Managed by:
Barnes County Commission
Barnes County Emergency Management
1525 12th St. NW
Valley City, ND 58072
Email: kfranklin@barnescounty.us
Phone: (701) 845-8508; (701) 845-8510

Plan Prepared by:

South Central
DAKOTA
Regional Council

P.O. Box 903
Jamestown, ND 58402-0903
Email: dkantrud@scdrc.org
or dschwartz@scdrc.org
Phone: (701) 952-8060

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1. Introduction

Executive Summary

The updating of the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP) was conducted over an 18-month period (per FEMA grant timeline). It included the review of hazards, risks, vulnerabilities, and capabilities of the county, and resulting mitigation actions in Barnes County, North Dakota. The review of hazard impacts to the county is ongoing by county officials, as are the efforts to mitigate injuries and damages from hazards. The planning process and this plan allow the county's residents, businesses, stakeholders, and federal and state agencies to have input and to identify actions to assure the safety and protection of people and property. A mitigation survey was administered during the planning process, which sampled 6.0 percent of households in Barnes County.

The hazards profiled in this plan include communicable disease, dam failure, drought, flood, geologic hazard, hazardous material release, homeland security incident, severe summer weather, severe winter weather, shortage or outage of critical materials or infrastructure, transportation accident, urban fire/structure collapse, wildland fire, and windstorm.

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan develops a mitigation strategy consisting of six goals and 90 mitigation projects based on an assessment of risks.

The following are the six goals that were reviewed, updated and approved:

Goal 1: Improve public awareness of hazards.

Goal 2: Implement education programs for people to protect themselves.

Goal 3: Improve planning and regulation in jurisdictions to mitigate hazards.

Goal 4: Reduce impact of hazards.

Goal 5: Improve resiliency of critical facilities and infrastructure.

Goal 6: Provide places of refuge and early warnings for public and vulnerable populations to take protective action during hazard events.

To assist in the use, implementation, and updating of this document, the plan includes the federal and state plan approval letters and plan review of this update, and the adoption letters from each of the jurisdictions are included in this document. The chapters and appendices provide a history of the data reviewed and analyzed in the production process of the plan.

Plan Structure

The update of the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP) is structured to include plan information specific to each incorporated city in one chapter (Chapter 8) with county information found throughout body of the pplan. This structure will provide each incorporated city with a jurisdiction-specific book to improve usability by county officials, residents, businesses, stakeholders, and federal and state agencies. This structure will also aide the Barnes County Emergency

Manager in maintaining the plan until the 2020 update. Appendix 8 serves as a placeholder for tracking plan update information.

Jurisdictions

The impact and other issues from natural hazard and manmade threats varies between incorporated cities. Based on information gathered at each jurisdictional meeting, a problem statement was formed to summarize the needs of the community. Each incorporated city and its problem statement is listed alphabetically. Additional information on each incorporated jurisdictions, including a jurisdictional profile, hazard scoring and notes, discussion on vulnerability, mitigation projects, and capabilities can be found in Chapter 8.

Barnes County

Barnes County is impacted by communicable disease, dam failure, drought, flood, geologic hazards, hazardous material release, homeland security incident, severe summer weather, severe winter weather, shortage or outage of critical materials or infrastructure, transportation accidents, urban fire/structure collapse, wildland fire, and windstorm. Flooding is a major issue in many communities due to the presence of a high water table, closed basins, and the Sheyenne River traversing through the county. Many communities experience isolation from impacts of hazards due to the rural nature of the county. The county has planning and regulatory, administrative and technical, financial, and education and outreach capabilities to accomplish mitigation. However, the county relies on outside sources for construction of permanent flood control measures and other large-scale mitigation projects.

Permanent flood protection, flood control measures, education and outreach, drainage, upgrading of critical facilities and infrastructure, upgrading of emergency sirens and construction of additional storms shelters are a priority for the county.

Dazey

Located in a closed basin, the city of Dazey experiences overland flooding causing damage to property, critical facilities, and infrastructure. The city lacks generators for backup power and the emergency siren is manually activated. With little to no capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of generators and an upgraded emergency siren are a priority for the city.

Fingal

The city of Fingal experiences overland flooding on Main Street/4th Avenue due to poor drainage. Changes in agriculture practices of surrounding farmland has increased runoff causing additional flooding issues in the city. Critical facilities and infrastructure are vulnerable to flooding. Transportation accidents are another issue as the city has seen an increase in truck and rail traffic. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of backup power sources, and improvements to transportation systems are a priority for the city.

Kathryn

Located in proximity to Clausen Springs Dam, which experienced major erosion in 2009, the city of Kathryn is vulnerable to a dam failure event. The Clausen Springs Dam and the Sheyenne River Valley National Scenic Byway attract recreation and temporary populations during summer months. The city is also located in a low point with respect to surrounding topography and is near the Sheyenne River, which contributes to overland flooding issues. The emergency siren on the fire hall is manually activated. The city receives tax revenue from rental income on a former school house occupied by Valley City State University for research purposes. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

The city of Kathryn's water supply is furnished by a spring-fed reservoir above the city and potable water is piped into the city. Two hazards threaten the city's water supply: geologic hazard, specifically landslide, and drought. The geologic hazard of landslide has caused the city of Kathryn to experience numerous water supply line breaks over the years. There have been four waterline breaks in 2014 alone. In addition, the reduced amount of rainfall has reduced the amount of water flowing into the collection site threatening the availability of potable water.

Education and outreach, flood control measures, installation of new and upgrading of water infrastructure, installation of a generator for backup power and an upgraded emergency siren are a priority for the city.

Leal

The city of Leal experiences overland flooding from 10 Mile Lake due to surrounding topography and inadequate drainage, which impacts infrastructure. The culvert under the CPR railroad line is suspected to have collapsed, further exacerbating flooding issues. The city has a manually-activated emergency siren instead of a siren activated by county-dispatch. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage/flood control measures and an upgraded emergency siren are a priority for the city.

Litchville

The city of Litchville is vulnerable to flooding and severe summer weather as heavy rain causes overland flooding and impacts critical facilities and infrastructure. Flooding occurs on city streets primarily near the city park. The city has a storm water drainage system, but the system lacks the capacity to allow for property drainage. Windstorms and high wind during severe summer weather also causes damage to structures in the city. Debris can clog drainage and contribute to overland flooding. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage and infrastructure maintenance are a priority for the city.

Nome

Severe summer weather and severe winter weather produce heavy precipitation impacting the city of Nome. Windstorms are common in the area causing power outages. Windstorms also cause debris and snow drifts to block roads. Residents are vulnerable to severe weather as the city does not have an official storm shelter. The city has a manually-activated emergency siren instead of a siren activated by

county-dispatch. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Burying of power lines, installation of backup generators and an upgraded emergency siren, and construction of a storm shelter are a priority for the city.

Oriska

The city of Oriska is vulnerable to floods and severe summer weather as heavy rain causes overland flooding and impacts critical facilities and infrastructure. Flooding occurs most frequently on city streets near the city park. The city does not have a storm water drainage system further contributing to flooding and drainage issues. Windstorms and high wind during severe summer weather also causes damage to structures in the city and produces shortage or outage of critical materials or infrastructure. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, and installation of backup generators and an upgraded emergency siren are a priority for the city.

Pillsbury

Severe winter weather produces heavy snow that blocks roads and results in overland flooding and drainage issues in the spring in the city of Pillsbury. With a high number of abandoned structures and trailer homes, and a high elderly population, the city is vulnerable to windstorms. Windstorms are a common occurrence in the city. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of an upgraded emergency siren and construction of a shelter are a priority for the city.

Rogers

The city of Rogers experiences overland flooding from severe summer and winter weather. The city also has poor drainage, lacks a storm water drainage system and has a high water table. Blocked roads from standing water are common. The lack of grade-separated railroad crossings is problematic with the increase in train traffic through the city due to energy development in the western part of the state. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of backup power for critical facilities and infrastructure, and improvements to the transportation system are a priority for the city.

Sanborn

The city of Sanborn experiences overland flooding from severe summer weather and severe winter weather, and impact to critical facilities and infrastructure. The lack of drainage of Sanborn Lake impacts an adjacent freight railroad line and roads leading to the city. Blocked roads occur from severe winter weather and can result in isolation of the city. With a high number of abandoned structures and trailer homes, and a high elderly population, the city is vulnerable to windstorms. The city has little to no capabilities for mitigation and therefore is dependent on outside sources.

Improved drainage, installation of additional generators for backup power, burying of power lines, and construction of a storm shelter are a priority for the city.

Sibley

Due to its location on Lake Ashtabula, the city of Sibley has a permanent population of around 30 residents and a temporary population from May to September of 300 residents for recreation. The city also experiences overland flooding issues due to surrounding topography. With little to no capabilities other than a drought management plan, the city is dependent on outside sources for mitigation.

Education and outreach to temporary residents, construction of flood control measures and a storm shelter are a priority for the city.

Valley City

The city of Valley City is located on the Sheyenne River which experiences severe riverine flooding. Flooding has impacted the city for decades. The city contains numerous vulnerable populations such as the only assisted living and senior housing developments in Barnes County, dormitory populations at Valley City State University, trailer/mobile home courts, a substantial elderly population, two elementary schools and one of the largest junior high/high schools in the surrounding area. The city has planning and regulatory, administrative and technical, financial, and education and outreach capabilities to accomplish mitigation. However, the city relies on outside sources for construction of permanent flood control measures and upgrading of infrastructure as these projects require millions of dollars in investment.

Education and outreach, permanent flood protection, flood control measures, buyouts of structures in hazard prone areas, education and outreach, and upgrading of critical facilities and infrastructure are a priority for the city.

Wimbledon

Severe summer weather and severe winter weather produce heavy precipitation in the city of Wimbledon. Due to spring melt of snow the lack of a drainage maintenance schedule for existing ditches, the city is vulnerable to flooding. Windstorms are frequent in the area, which block roads due to snow drifts and various debris, and cause power outages. The city adopted revised trailer park ordinances due to the large amount of trailer homes. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of generators for backup power and a storm shelter are a priority for the city.

Background

The Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP) was developed and approved by Federal Management Agency (FEMA) in 2005 and updated in 2010. The plan was again updated and submitted for FEMA approval in 2015 to address the needs of people living and working in Barnes County and its incorporated cities: Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City and Wimbledon.

This document includes a profile of Barnes County and its incorporated cities. The planning process is explained along with those involved in the updating of the county's multi-jurisdictional plan. A comprehensive assessment is included in the plan of the risks that affect the county and its jurisdictions, maps, hazards, threats and risk assessment, mitigation strategies including goals, objectives, projects, and plan maintenance.

This document articulates the discussions and considerations stated during the planning process in 2014 and 2015 to update the 2010 Plan. The MHMP Planning Committee understands that the plan must be dynamic and detailed to include the specific risks of threats and hazards to the county and its jurisdictions. Improvements, updates, and revisions will be made constantly to assure this plan continues to mitigate the potential losses and damages that can impact people and property in Barnes County.

Purpose

As defined by the Disaster Mitigation Act of 2000, hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. The Act of 2000 was an amendment to the Robert T. Stafford Disaster Relief and Emergency Assistance to authorize a program for pre-disaster mitigation, to streamline the administration of disaster relief, to control the Federal costs of disaster assistance, and for other purposes. According to the 2014 State of North Dakota MHMP, for every dollar spent on mitigation, society saves on average four dollars in avoided future losses. Mitigation can range from infrastructure projects such as raising of roads, burying of power lines, or installation of generators for critical facilities and infrastructure to public education and outreach programs.

The purpose of this plan is to fulfill federal, state, and local hazard mitigation planning responsibilities; to promote pre- and post-disaster mitigation measures, short and/or 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; to improve quality of life; and to eliminate or minimize conditions which would have an undesirable impact on our citizens, the economy, environment, and well-being of the county.

Objective

The objective of this plan is to establish a methodical process to assist in hazard and threat identification, impact evaluation, and action plan development to decrease the impacts from hazards where possible and to protect lives and property.

Scope

The scope of the Barnes County Multi-Hazard Mitigation Plan is countywide. The Plan is not necessarily limited to Federal, State, or locally declared disasters or emergencies. Any time situations or incidents occur that produce a requirement for mitigation actions, activities, and strategies, etc.; they will be developed and incorporated into the Barnes County Multi-Hazard Mitigation Plan.

2. Adoption Documentation

Authority

Federal: Public Law 93-288 as amended, established the basis for federal mitigation activity in 1974. A section of this Act requires the identification, evaluation, and mitigation of hazards as a prerequisite for state receipt of future disaster assistance outlays. Since 1974, many additional programs, regulations, and laws have expanded on the original Stafford Act, several additional provisions were also added that provided for the availability of significant mitigation measures in the aftermath or presidentially declared disasters. Civil preparedness Guide 1-3, Chapter 6-Hazard Mitigation Assistance Programs places emphasis on hazard mitigation planning directed towards hazards with a high impact and threat potential.

Legislative: The North Dakota Century Code, Chapter 37-17.1 requires North Dakota Division of Emergency Management to coordinate the development of a Hazard Mitigation Plan. Other state laws require various state agencies to mitigate the effects or impacts of hazards in regard to public safety, environment, etc. The North Dakota State Water Commission is responsible for assisting in the flood insurance program and is the lead agency in flood hazard mitigation actions.

Executive: The Governor has the leadership role in the issuance of guidance to all state agencies to minimize the effects of hazards on the citizens of North Dakota. In state and federal recovery agreements following a presidentially declared disaster, the Governor initiates updating of the state and local mitigation plans based on federal requirements or state and presidentially declared disaster (see State Administrative Recovery Handbook for Mitigation Assistance).

Local: Local governments play an essential role in implementing effective mitigation, both before and after disaster events. Each local government will review all damages, losses, and related impacts to determine the need or requirement for mitigation action and planning whenever seriously affected by a disaster, or when applying for state or federal recovery assistance. In Barnes County, the local governing body responsibility for carrying out plans and policies is the County Commission. The Barnes County Commission and each incorporated city in the county – Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City and Wimbleton – are responsible for reviewing and updating ordinances. The County Commission represents all townships and unincorporated communities in the county for planning purposes. Budgets are limited and do not allow the county and jurisdictions the ability to complete as many projects as desired. The city of Rogers was not included in the 2010 update, but did participate in 2005 and is participating in 2015. All incorporated city jurisdictions and the Barnes Rural Water District are included in the 2015 update.

Promulgation Statement

Government at all levels has the responsibility for the protection of life, property, and the environment from hazards and threats which are known to impact jurisdictions. The jurisdictions of Barnes County, by resolution, hereby adopt the concepts and conditions set forth by the Barnes County Multi-Hazard Mitigation Plan (MHMP).

2. Adoption Documentation

The individual jurisdictions' Resolutions of Adoption of this plan are in Appendix 1.



ND Department of Emergency Services

PO Box 5511

Tel: (701) 328-8100

Email: nddes@nd.gov

Bismarck, ND 58506-5511

Fax: (701) 328-8181

Website: www.nd.gov/des

Ensuring a safe and secure homeland for all North Dakotans

July 20, 2015

Cindy Schwehr, Chair
Barnes County Commission
230 4th Street NW, Room 202
Valley City, ND 58072

Dear Chair Schwehr:

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

The Federal Emergency Management Agency (FEMA) Region VIII, approved the Barnes County Multi-Hazard Mitigation Plan (MHMP) July 17, 2015, through July 16, 2020, for Barnes County and the Cities of Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Sanborn, Sibley, Valley City, and Wimbledon.

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

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

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

Jack Dalrymple
Governor

Major General David Sprynczynatyk
Director – Department of Emergency Services

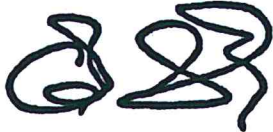
Greg M. Wilz
Director - Division of Homeland Security

Mike Lynk
Director - Division of State Radio

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

Thanks for all your hard work.

Sincerely,

A handwritten signature in black ink, appearing to read 'C Schulz', with a stylized flourish at the end.

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

Enclosures: 7-17-2015 FEMA Approval Letter, Plan Review Tool

cc: Kim Franklin, Barnes County Emergency Manager



FEMA

R8-MT

July 17, 2015

Mr. Cody Shulz
Disaster Recovery Chief
North Dakota Department of Emergency Services
Fraire Barracks Lane, Building 35
P.O. Box 5511
Bismark, North Dakota 58502-5511

Dear Mr. Shulz:

We are pleased to announce the approval of the **Barnes County Multi-Hazard Mitigation Plan** as meeting the requirements of the Stafford Act and Title 44 Code of Federal Regulations 201.6 for a local hazard mitigation plan. The plan approval extends to the following participating jurisdictions that have adopted the plan: **Barnes County and the Cities of Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City and Wimbledon.**

The approved jurisdictions are eligible for FEMA Hazard Mitigation Assistance grant programs. All requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular programs under which the application is submitted. Approved mitigation plans may be eligible for points under the National Flood Insurance Program Community Rating System.

This plan is approved through July 16, 2020. A local jurisdiction must revise its plan to reflect changes in development, progress in local mitigation efforts, changes in priorities, and resubmit for approval within five years to continue to be eligible for mitigation project grant funding.

We have provided comments and recommended revisions of the enclosed Plan Review Tool. We wish to thank all jurisdictions that participated in the planning process and commend your continued commitment to reducing future disaster losses.

Sincerely, 

Mike Hillenburg
Acting Mitigation Division Director

Enclosures: Plan Review Tool

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

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

| | | |
|--|---|---|
| Jurisdiction: Barnes County | Title of Plan: Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan Update 2015 | Date of Plan: March 2015 |
| Local Point of Contact: Kim Franklin | Address: 1525 12th St. NW Valley City, ND 58072 | E-Mail: kfranklin@co.barnes.nd.us |
| Title: Emergency Manager | | |
| Agency: County Emergency Management | | |
| Phone Number: (701) 845-8510 | | |

| | | |
|--|--|--------------------------------------|
| State Reviewer: Kathleen Donahue, NDDDES | Title: Deputy, Recovery & Mitigation | Date: 2/25/2015, 3/25/2015 |
|--|--|--------------------------------------|

| | | |
|---|------------------------------------|--------------------------------|
| FEMA Reviewer: Margaret Doherty | Title: Community Planner | Date: April 16, 2015 |
| Date Received in FEMA Region VIII | March 25, 2015 | |
| Plan Not Approved | | |
| Plan Approvable Pending Adoption | April 17, 2015 | |
| Plan Approved | July 17, 2015 | |

**SECTION 1:
MULTI-JURISDICTION SUMMARY SHEET**

| MULTI-JURISDICTION SUMMARY SHEET | | | | | | | | | |
|----------------------------------|-------------------|-------------------|----------------------|----------------------------------|------------------------|---------|------------------------|------------------|------------------------|
| # | Jurisdiction Name | Jurisdiction Type | Jurisdiction Contact | Email | Requirements Met (Y/N) | | | | |
| | | | | | A. Planning Process | B. HIRA | C. Mitigation Strategy | D. Update Rqmts. | E. Adoption Resolution |
| 1 | Barnes | County | Kim Franklin | kfranklin@co.barnes.nd.us | Y | Y | Y | Y | Y |
| 2 | Dazey | City | Daryl Kunze | daryl@ictc.com | Y | Y | Y | Y | Y |
| 3 | Fingal | City | Corinne Ertelt | cee1929@hotmail.com | Y | Y | Y | Y | Y |
| 4 | Kathryn | City | Shirley Sivertson | sassjs@drtel.net | Y | Y | Y | Y | Y |
| 5 | Leal | City | Mary Udem | m.udem@hotmail.com | Y | Y | Y | Y | Y |
| 6 | Litchville | City | Connie Smith | litchville@drtel.net | Y | Y | Y | Y | Y |
| 7 | Nome | City | Lance Capman | lcapman1@hotmail.com | Y | Y | Y | Y | Y |
| 8 | Oriska | City | Rick Pommerer | threepracing@hotmail.com | Y | Y | Y | Y | Y |
| 9 | Pillsbury | City | Dennis McGuire | thebigdude@outlook.com | Y | Y | Y | Y | Y |
| 10 | Rogers | City | Tina Vincent | tinahofmann@outlook.com | Y | Y | Y | NA | Y |
| 11 | Sanborn | City | Julie Franklin | Jfranklin_@hotmail.com | Y | Y | Y | Y | Y |
| 12 | Sibley | City | Typhanny Schuler | typhanny.schuler@bankforward.com | Y | Y | Y | Y | Y |
| 13 | Valley City | City | David Schelkoph | dschelkoph@valleycity.us | Y | 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 Rqtrms. | E. Adoption Resolution |
| 14 | Wimbleton | City | Kurt Wagner | WRFD@daktel.com | Y | Y | Y | Y | Y |

**SECTION 2:
REGULATION CHECKLIST**

| REGULATION CHECKLIST | | Location in Plan (section and/or page number) | Met | Not Met |
|---|---|---|-----|------------|
| Regulation (44 CFR 201.6 Local Mitigation Plans) | | | | |
| ELEMENT A. PLANNING PROCESS | | | | |
| A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1)) | Chapter 3 & Tables 3.1, 3.2, 3.3, 3.4, 3.5 3.6 Chapter 4, Chapter 5: pgs. 5-5 to 5-11, and Appendices 2, 3, 5, and 7 | 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)) | Chapter 3: Tables 3.5, 3.6 Chapter 7: Tables 7.1, 7.2, 7.3, 7.4 Appendix 2, 3, 4, and 5 | X | | |
| A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1)) | Chapter 3: pg. 3-39, Tables 3.7, 3.8, 3.9, 3.10 Chapter 5: pgs. 5-5 to 5-11 Appendices 2, 4, 5, and 7 | X | | |
| A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3)) | Chapter 3: Tables 3.7, 3.8, 3.9, 3.10; Chapter 4: Tables 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19, Figures 4.2, 4.3; Chapter 5: Tables 5.1 & 5.2; and Chapter 7: Tables 7.1, 7.2, 7.3, 7.4 | 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)) | Chapter 3: Pg. 3-4, last paragraph; Chapter 6 & Mitigation Projects 1, 3, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 27, 28, 30; Chapters 8 and 10; and Appendix 8 | 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)) | Chapter 6: pg. 6-11, 6-26, Table 6.2 Chapters 8 and 10 Appendix 8 | X | | |
| <u>ELEMENT A: REQUIRED REVISIONS</u> | | | | |

| ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT | | | |
|---|--|---|--|
| B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i)) | Chapter 3 & Table 3.11 Chapter 5: pgs: 5-1-3, 5-2-3, 5-3-4, 5-4-5, 5-5-2, 5-6-4, 5-7-1, 5-8-7, 5-9-4, 5-10-3, 5-11-2, 5-12-3, 5-13-3, 5-14-2; Chapter 5: Tables 5.1 & 5.2; Chapter 5: Hazard Profile and History heading at the end of each section.; Chapter 6; and Appendices 5 and 7 | 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)) | Chapter 3 & Table 3.11 Chapter 5: pgs: 5-1-3, 5-2-3, 5-3-4, 5-4-5, 5-5-2, 5-6-4, 5-7-1, 5-8-7, 5-9-4, 5-10-3, 5-11-2, 5-12-3, 5-13-3, 5-14-2; Chapter 5: Tables 5.1 & 5.2; Chapter 5: Hazard Profile and History section at the end of each sub-chapter.; and Appendices 5 and 7 | 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)) | Chapter 3 & Tables 3.3, 3.11; Chapter 4; Chapter 5: Tables 5.1 & 5.2; Chapter 5 (i.e. pg. 5-1-3) Chapter 5: Hazard Profile and History section at the end of each sub-chapter. Chapters 7 and 8 Appendices 5 and 7 | 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)) | Chapter 5: pg. 5-4-3 Chapter 6: Mitigation Projects 11, 12, 13, 14, 16, 18, 19, 28, 30, | X | |
| <u>ELEMENT B: REQUIRED REVISIONS</u> | | | |
| 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)) | Appendix 1 Chapter 4: pg. 4-6 to 4-10, Tables 4.4, 4.6, 4.7, 4.8 Chapters 7 and 8 | 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)) | Chapter 5: pg. 5-4-6 & Table 5.4.3 Chapters 6 and 8 | X | |
| C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i)) | Chapter 1 Chapter 3: pg. 3-4 Chapters 6 and 8 | 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)) | Chapter 3: pg. 3-4 Chapters 6 and 8 | 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)) | Chapter 6 & Table 6.1 Chapter 8 – all sections | X | |
| C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii)) | Chapter 3: pg. 3-4, last paragraph Chapters 6, 7, and 8. Appendix 8 | 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)) | Chapter 3 Chapter 4: pg. 4-6 to 4-22, Table 4.19, Figure 4.2, Figure 4.3 Chapters 5, 6 and 8 Appendices 5 and 8 | X | |
| D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3)) | Chapter 3: pg. 3-5 to 3-18, Table 3.3 Chapters 6, 7, and 8. Appendix 8 | X | |
| D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3)) | Chapters 3, 6, and 8. Appendix 5 | X | |
| 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)) | | NA | |
| E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5)) | Appendix 1 | 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

**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 upon as part of the next update.

State Comments – Overall

The Executive Summary contained a good description of vulnerability at-a-glance for each jurisdiction. The summary clearly articulated each community's mitigation priorities. The plan itself is voluminous, but the understanding is that jurisdiction-specific books (based on Chapter Eight) will be developed, which the emergency manager has determined would be best method for ensuring the plan is usable for each jurisdiction. Chapter Eight contains good, succinct descriptions of hazards, vulnerabilities, capabilities and strategies for each jurisdiction. The inclusion of capabilities and maps in Chapter Eight helps to better understand the communities' vulnerabilities.

FEMA

We concur with the State's comments. The Executive Summary is very helpful and the public outreach efforts were exceptional; well done! As part of the next update, consider additional ways to streamline the document, such as removing statements that are repeated for multiple jurisdictions and redundant presentation of the same data. We would appreciate receiving a copy of one of the 'jurisdiction-specific books' when they are complete.

Element A: Planning Process

State Comments

Requirements A1 and A2 – The planning process reflected a strong, broad-based effort that included jurisdictional and regulatory representatives, the business community and the public. Meeting summaries indicate participants influenced hazard assessments and mitigation project development. The Planning Team made a concerted effort to keep participants involved throughout the process by traveling to and conducting meetings at each jurisdiction. Additional meetings included such outreach as participation at the annual township officers' association meeting. The Planning Team also ensured topics of concern were addressed in depth by inviting subject matter experts (SMEs) to serve on panels. Panel participants also included representatives of agencies with regulatory authority. Data collection also required outreach to other SMEs such as the Canadian Pacific Railway.

For the next update, consider expanding participation in the planning process to NDSU Extension Service, historical organizations and social services agencies. These agencies can provide good data related to past events and community needs, respectively.

Requirement A3 – Throughout the planning process, news releases were issued for meetings to encourage public participation. Local media ensured publication of these releases. The Planning Team, early in the process, developed a public survey and then coordinated outreach efforts with area businesses and communities. A total of 302 responded to the survey.

An example of the best practice is the outreach to businesses. As indicated in an e-mail conversation with NDDDES and South Central Planning, outreach to large employers was the tipping point in receiving public comment. Consultant Daniel Schwartz printed 100 copies of the survey, delivered it to John Deere with a note explaining the purpose, and received 70 returned surveys in the mail.

Requirements A5 & A6 – Appendix B is a placeholder for tracking plan update information.

Element B: Hazard Identification and Risk Assessment

State Comments

Requirement B3 -- For the next update, consider adding a column to Table 5.2.2 (p. 5-2-7), *Dams in Barnes County*, listing potential impacts, such as area of inundation, farmstead/homes, agricultural land.

For the next update, expand the vulnerability analysis regarding Sibley to include Lake Ashtabula visitors who may need sheltering. It's important to remember that the National Guard is a great resource and has a strong presence in Barnes County, but may not be available, or there may be other resources available. Consider restating National Guard assistance references to "Outside Assistance, coordinated through the Local Emergency Operations Center (EOC)." The Local EOC would request assistance through the State EOC.

Element C: Mitigation Strategy

State Comments

Requirement C4: Overall, mitigation actions meet all required elements in C4. On page 5-4-6, the plan referenced that capabilities were scored by plan consultants based on the capability assessment tool provided through FEMA guidance. Did the Planning Team review the tool?

Comments provided by Planning Team members and the public influenced strategy development. As an example, on page 3-18, the N.D. Department of Health suggested a mitigation project for the disposal of inert waste in the county, which resulted in a mitigation project (Barnes County Project 15). The Valley City Police Chief also expressed concern regarding the increased traffic related to the growth of the petroleum industry, resulting in revisions to the profile chapter and the addition of a mitigation project (Barnes County Project 26).

The communities rely heavily on generator and siren projects. Lack of adequate drainage is problematic throughout the county. For the next update, more fully apply the vulnerability assessments when determining strategies. As an example, in the Dazey section of Chapter 8, it mentions the removal of tree rows as a vulnerability, but there does not appear to be a discussion of whether the team considered an action related to this vulnerability. A lack of fire breaks was identified for the city of Fingal, but there was no related strategy. Has consideration been given to working with the State Water Commission to identify potential mitigation strategies related to Clausen Springs Dam? Consider a strategy to coordinate with the State Water Commission to identify potential mitigation strategies to decrease vulnerability to dam failure. The State Water Commission provided the following suggestion: *it might be a good idea to suggest some type of exercise or drill, or even some practice to make sure the city keeps updated on how to apply it.* Since landslides are a concern to Kathryn, what types of mitigation strategies were considered?

For the next update, discuss action items in more detail. For example with Project 13, how do the county and cities plan to strengthen building codes and land use regulations. In other words, what types of modifications are going to be required to strengthen codes and regulations to protect citizens?

Element D: Plan Review, Evaluation, and Implementation (Plan Updates Only)

State Comments

The plan discusses impacts of development and changing priorities. The plan includes strategies to address new development as it relates to hazards.

B. Resources for Implementing Your Approved Plan

State

The N.D. Department of Emergency Services is developing a Hazard Mitigation Toolbox on its webpage: <http://www.nd.gov/des/disaster/>. The goal is to provide guidance to emergency managers and their contractors regarding available resources.

FEMA

- The mitigation strategy includes projects that may be eligible for FEMA's grant programs. Contact your State Hazard Mitigation Officer for application information.
- Each year, FEMA partners with the State on training courses designed to help communities be more successful in their applications for grants, including the Unified Hazard Mitigation Grant Assistance Application Development Course and the Benefit Cost Analysis (BCA) course. Contact your State Hazard Mitigation Officer for course offering schedules.
- It may be appropriate to set up a Community Assistance Visit with FEMA to provide technical assistance to communities in the review and/or updating of their floodplain ordinances to meet the new model ordinance. Consider contacting your State NFIP Coordinator for more information.
- The US Department of Transportation's Hazardous Materials Emergency Preparedness (HMEP) grant program provides financial and technical assistance as well as national direction and guidance to enhance State, Territorial, Tribal, and local hazardous materials emergency planning and training. See this website for more information: <http://www.phmsa.dot.gov/grants-state-programs>.

3. Planning Process

3.1 Background

The Barnes County Commission initiated the process to update its multi-hazard mitigation plan (MHMP) by applying for and receiving a grant to assist in the cost of the planning process. The current Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan was approved by the North Dakota Department of Emergency Services and the Federal Emergency Management Agency in February 2010 and expires June 2015. The grant to update the Barnes County MHMP was awarded January 22, 2013, with an initial grant end date of July 22, 2015.

The 14 jurisdictions in the 2015 plan update are shown in Table 3.1. The city of Rogers did not participate in the 2010 mitigation plan, but did participate in the 2005 plan and signed a letter of commitment to be and were an active participant in the 2015 update of the Barnes County Mitigation Plan.

Table 3.1 – Jurisdictional Continued Participation in Mitigation Planning

| Jurisdictions Represented in Plan | Participation |
|--|--|
| Barnes County | Continued Participation (2005-2015) |
| City of Dazey | Continued Participation (2005-2015) |
| City of Fingal | Continued Participation (2005-2015) |
| City of Kathryn | Continued Participation (2005-2015) |
| City of Leal | Continued Participation (2005-2015) |
| City of Litchville | Continued Participation (2005-2015) |
| City of Nome | Continued Participation (2005-2015) |
| City of Oriska | Continued Participation (2005-2015) |
| City of Pillsbury | Continued Participation (2005-2015) |
| City of Rogers | Participation in 2005. Declined participation in 2010. Participation in 2015 |
| City of Sanborn | Continued Participation (2005-2015) |
| City of Sibley | Continued Participation (2005-2015) |
| City of Valley City | Continued Participation (2005-2015) |
| City of Wimbledon | Continued Participation (2005-2015) |

Whereas, the jurisdictions have limited capability to undertake extensive participation in the preparation of a hazard mitigation plan, with the exception of Valley City, the Barnes County Commission contracted with the South Central Dakota Regional Council of Jamestown, N.D., to facilitate the planning process for the analysis and development of the updated to the hazard mitigation plan.

Building the Planning Committee: Meetings to begin the planning process to update the 2010 Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan began December, 2012. Deb Kantrud, executive director of South Central Dakota Regional Council, met with the Barnes County Commission to discuss the process to update the plan. Emergency Manager Kim Franklin was named the point of contact for the planning process. Kantrud worked with County Emergency Manager Franklin to identify a list of representatives from each jurisdiction and stakeholders to be part of the planning process. Invitations were sent to 42 representatives. For the planning process, the Barnes County Commission used a 13-

person LEPC Planning Committee from the following entities: county commissioner, Barnes County Ambulance, City-County Health District, Mercy Hospital, Central Valley Health District, Valley City Fire Department, Sanborn Fire Department, Barnes County Sheriff’s Office, Valley City Police Department, Agrium and Dakota Plains Co-op, as well as the mayor or an auditor for each city jurisdiction in Barnes County. An invitation for participation was sent to representatives from Valley City State University prior to the third LEPC meeting held on March 24, 2014. In addition, representatives from the United States Army Corps of Engineers, the National Guard, Baldhill Dam, Barnes County Water Resource District, and the North Dakota Department of Transportation were invited to attend and participate in the fourth committee meeting on May 19, 2014, which specifically focused on flooding.

See Appendix 2 for attendance records for committee meetings and jurisdictional meetings. In addition, stakeholders were identified. Invitations via mail and email were sent to 60 individuals prior to each committee meeting. News releases were sent to the media prior to committee and jurisdictional meetings. (See Appendix 4)

Plan committee members included the following individuals shown on Table 3.2.

Table 3.2 – Planning Committee Members

| Representing | Entity | Title | Name |
|-----------------------------------|---------------------------------------|--|---------------------------------|
| LEPC | Barnes County Emergency Management | Barnes County Emergency Manager | Kimberly Franklin |
| LEPC | Barnes County Commission | Barnes County Commissioner | Eldred Knutson |
| Businesses/Major Employers | | | |
| LEPC | Dakota Plains Co-op | Safety Specialist | Casey Wieck |
| LEPC | Agrium | Supervisor | Jesse Potratz |
| Emergency Medical Services | | | |
| LEPC | Barnes County Ambulance | Director | Scott Miller |
| LEPC | Mercy Hospital | Emergency Preparedness Coordinator | JoAnn Trader |
| Fire Departments | | | |
| LEPC | Sanborn Fire Department | Fire Chief | DuWayne Didier |
| LEPC | Valley City Fire Dept. | Fire Chief | Gary Retterath |
| Law Enforcement | | | |
| LEPC | Barnes County Sheriff’s Office | Sheriff, Chief Deputy | Randy McClafin, Don Fiebiger |
| LEPC | Valley City Police Dept. | Chief of Police | Fred Thompson |
| Regional/County Entities | | | |
| LEPC | Central Valley Health District | Regional Emergency Preparedness Coordinator | Frank Balak |
| LEPC | City-County Health District | Director | Theresa Will |

Table 3.2 – Planning Committee Members - Continued

| Representing | Entity | Title | Name |
|----------------------|--------------------------|---|--|
| Jurisdictions | | | |
| Barnes County | Barnes County Commission | Barnes County Commissioner | Eldred Knutson |
| City of Dazey | City of Dazey | Mayor, Auditor, Dazey Fire Dept. | Gary Hare, Darlene Hare, Daryl Kunze |
| City of Fingal | City of Fingal | Mayor, Auditor | John Behm, Corrine Ertelt |
| City of Kathryn | City of Kathryn | Mayor, Auditor | Paul Fisher, Shirley Sivertson |
| City of Leal | City of Leal | Mayor, Auditor | David Lokken, Jr., Mary Udem |
| City of Litchville | City of Litchville | Mayor, Auditor | Brad Botner, Connie Smith |
| City of Nome | City of Nome | Mayor, Auditor | Lance Capman, Alice Capman |
| City of Oriska | City of Oriska | Mayor, Auditor | Rick Pommerer, Katie Pommerer |
| City of Pillsbury | City of Pillsbury | Mayor, Auditor | Dan Lindsith, Dennis McGuire |
| City of Rogers | City of Rogers | Mayor, Auditor | Lynn Koerbernck, Tina Vincent |
| City of Sanborn | City of Sanborn | Mayor, Auditor, City Alderman | Nikkie Grebel, Julie Franklin, Kim Franklin |
| City of Sibley | City of Sibley | Mayor, Auditor | Al Bender, Typhanny Schuler |
| City of Valley City | City of Valley City | Mayor, Auditor, City Administrator, Police Chief, Fire Dept. Fire Chief, Fire Dept. Captain | Bob Werkhoven, Avis Richter, Dave Schelkoph, Fred Thompson, Gary Retterath, Ron Burchill |
| City of Wimbledon | City of Wimbledon | Mayor, Auditor | Roger Pickar, Leon Doyle |

The Planning Committee had the authority in Barnes County to review, update, and create mitigation strategies, objectives and projects for the plan to be approved by the Barnes County Commission. In addition to the committee meetings, jurisdictional meetings were held with the city councils of Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, and Wimbledon. Representatives from the fire departments and water board were also invited to the jurisdictional meetings. The agendas included a review of hazard history, risk assessment, and review and updating of mitigation projects. Meeting participation and individual discussion were also held with emergency services, school leaders, law enforcement, chamber of commerce, businesses, and federal and state agencies. (See Appendix 5)

Summary

The Barnes County planning included nine committee meetings. All meetings were open to the public meetings and news releases encouraged the public to attend. A public hearing was held to accept comments on the draft plan. It was held at the Barnes County Highway Department in Valley City. One

jurisdictional meeting was held in the cities of Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, and Wimbledon. In addition, face-to-face, phone and e-mail interviews were conducted to gather data and input from public and private sector individuals and entities and state and federal agencies. Also, a community hazard survey was conducted. Hundreds of surveys were distributed to businesses, churches, employers, community organizations, and community events. Three hundred and two responses were received.

After reviewing the county's history of hazards, identifying vulnerabilities and losses, the Planning Committee reviewed hazards and identified the Barnes County Hazards to include:

- Communicable Disease
- Dam Failure
- Drought
- Flood – Riverine and Overland
- Geologic Hazards – Landslide
- Hazardous Material Release
- Homeland Security Incident
- Severe Summer Weather
- Severe Winter Weather
- Shortage or Outage of Critical Materials or Infrastructure
- Transportation Accident
- Urban Fire/ Structure Collapse
- Wildland Fire
- Windstorm

The goals from the 2010 Barnes County MHMP were as follows:

- Goal 1: Save Lives and Reduce Injuries.
- Goal 2: Avoid Damage to Property.
- Goal 3: Protect the Environment.
- Goal 4: Promote Hazard Mitigation as an Integrated Policy.

The Planning Committee revised and expanded the goals to six. A total of 90 projects were identified and included in this plan update to mitigate future loss of life and property. Problem statements were formulated and used to identify specific actionable mitigation projects for each incorporated jurisdiction.

The six goals are:

- Goal 1: Improve public awareness of hazards.
- Goal 2: Implement education programs for people to protect themselves and property.
- Goal 3: Improve planning and regulations in jurisdictions to mitigate hazards.
- Goal 4: Reduce impact of hazards.
- Goal 5: Improve resiliency of critical facilities and infrastructure.
- Goal 6: Provide places of refuge and early warnings for public and vulnerable populations to take protective action during hazard events.

The 90 projects are identified and ranked in Chapter 6 of this plan. The status of each mitigation project from the 2010 Barnes County MHMP is shown in Table 3.3.

This mitigation plan will also be incorporated into city, county, regional, and state plans. The information is being incorporated into the Barnes County Emergency Operations Plan and other emergency preparedness and response plans. The city of Valley City will use information in the mitigation plan for long and short-term plans, including, but not limited to: flood mitigation projects, ordinances, and infrastructure improvements. All jurisdictions (excluding Valley City) will use the plan's data as they review county and city ordinances, potentially implement zoning, and formulate capital improvement plans and project lists. The data in this plan is being used in the county's capital improvement and development plans, South Central Dakota Regional Council's Comprehensive Economic Development Strategies and Disaster Resiliency Plan for the U.S. Department of Commerce Economic Development Administration, and the state of North Dakota mitigation plan.

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|---------------|---|------------------|--|
| Barnes County | Barnes County Hazard Mitigation buyouts of landslide and flood threatened homes. To purchase and turn to green way unsuitable lots because of water. | Flood | Ongoing and continue. Areas along Lake Ashtabula and the cities of Kathryn and Valley City remain a threat to structures and homes from landslides and flooding along Sheyenne River. Barnes County Projects 16 and 17. |
| Barnes County | Barnes County Sanborn Lake Sheet Water Drainage project or Grade Raise Old 10. To protect Old Highway 10 from water on the road bed and road bed instability. | Flood | Completed. Done in 2012. Grade raised on Old Hwy 10. |
| Barnes County | Barnes County buyouts of homes that have intractable water problems. To turn homes on lots with water, structural problems, and mold into greenway. | Flood | Ongoing and continue. Three homes bought out in 2009 and one bought out in 2011. Barnes County Project 16. |
| Barnes County | Barnes County riprap of Old Highway 10 west of N.D. Highway 1. To prevent erosion of roadbed. | Flood | Completed. Completed in 2012 and is no longer an issue. |
| Barnes County | Barnes County road stabilization and/or grade raises. To protect road infrastructure. | Flood | Ongoing and continue. Barnes County Projects 25 and 16. |
| Barnes County | Barnes County river channel clean out. To clear the channel so flood water can flow easier. | Flood | Completed 2013. Ongoing and continue. Barnes County Project 28. |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|---------------|--|---------------------|--|
| Barnes County | Public information and weather spotting. Goal to prevent loss of human life. | Summer Storm | Ongoing and continue. Barnes County Project 6. |
| Barnes County | Public education through the media and inserts in bills. Goal to lessen damage from drought. | Drought | Ongoing and continue. Barnes County Project 2. |
| Barnes County | Public information, have public listen to television and radio for weather information. Individuals encouraged yearly to keep at least five days of non-perishable food, medicines, and specialty items like diapers and formula on hand. Individuals encouraged to use snow tires, have travel kits and extra blankets and maintain own generators. Goal to protect human life. | Winter Storm | Ongoing and continue. Barnes County Projects 1 and 23. |
| Barnes County | Hazardous Materials training for responders to protect citizen and first responder lives. | Hazardous Materials | Delete. Training is not mitigation. |
| Barnes County | Monitor the dam, the Corps of Engineers monitors the dam. The goal is to protect human life and prevent property damage. Clausen Springs is monitored by Barnes County Parks. | Dam Failure | Ongoing and continue. Barnes County Project 27. |
| Barnes County | Public education on dangers of hazardous materials to protect human life. | Hazardous Materials | Continue. Barnes County Projects 5 and 21. Valley City Project 4. |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|---------------|--|--------------------------|---|
| Barnes County | Infrastructure changes: Inert landfill expansion to protect human life from pollution | Hazardous Materials | <p>Continue.</p> <p>Change to create inert landfill, not expand.</p> <p>Barnes County Project 15.</p> |
| Barnes County | Fire Codes to protect human life and lessen property damage. | Urban Fire | <p>Continue. Change to strengthen fire codes/building codes.</p> <p>Barnes County Projects 9, 11, and 13.</p> |
| Barnes County | Public information: Clear areas next to houses and keep grass short and green to prevent loss of human life and protect property. | Urban Fire | <p>Continue.</p> <p>Revise strategy as wording is poor.</p> <p>Barnes County Project 8.</p> |
| Barnes County | Public Information: Keep areas clear around buildings to protect human life. | Rural Fire | <p>Ongoing and continue.</p> <p>Barnes County Project 8.</p> |
| Barnes County | Monitor public actions: Law enforcement monitors activities, targeted patrols at unspecified times, engage public in reporting suspicious activities and extra security at Baldhill Dam and National Guard Armory to prevent terrorist acts. | Civil Disorder/Terrorism | <p>Delete.</p> <p>Not mitigation.</p> |
| Barnes County | Mutual aid, organization of agencies, on scene commanders, and exercises through training and mutual aid agreements to protect human life. | Transportation Accidents | <p>Completed.</p> <p>County-wide mutual aid agreements signed. Mutual aid with Cass, Stutsman, Steele, Ransom, LaMoure, Griggs Counties.</p> |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|---------------|---|--------------------------------|---|
| Barnes County | Mutual aid, organization of agencies, on scene commanders, and exercises through training and mutual aid agreements to protect human life. | Transportation Accidents | Completed. County-wide mutual aid agreements signed. Mutual aid with Cass, Stutsman, Steele, Ransom, LaMoure, Griggs Counties. |
| Barnes County | Purchase properties that are on landslide lots. Deep bore water lines to go under the slide and prevent breakage. Abandon roads and streets that slide and barricade them. | Landslides | Ongoing and continue. Some buyouts have been done. Barnes County Project 17. |
| Barnes County | Public Information: Encourage public to keep extra medications, baby needs, food, etc. on hand to prevent hardship on citizens and possibly save lives. | Shortage of Critical Materials | Continue. Combine with other project. Barnes County Project 3. |
| Barnes County | Education and outreach of the NFIP program to insurance agents, building permit office, and Realtors in the county. | Flooding | Ongoing and Continue. Barnes County Projects 18 and 19. Valley City Projects 9 and 10. |
| Barnes County | Security can range from a nuclear accident, or deliberate bombing, to a mere threat, problems include the lack of security, minimal warning, and the inability to get information out to the public because some people do not read newspapers, watch television or listen to the radio. Heightened security is critical during periods of high risk. Volunteer help will be needed. Goal is to protect human life. | National Security | Delete. Not mitigation. |
| Dazey | Dazey Lagoon Slough Area Drainage Project. To reduce water seeping into basements causing structural damage, mold, and rusting of furnace and appliances. | Flood | Continue. Dazey Project 1. |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|------------|---|------------------------------------|---|
| Fingal | Generators and power hookups at lift station to prevent water flooding homes. | Flooding | Completed. City received grant funding assistance for the project. Has portable generator only. Fingal Project 1. |
| Kathryn | Repair the Clausen Springs Dam to stop the flood or complete destruction of the city of Kathryn (another option would be to buyout the city). | Flooding | Completed. Rip rap installed, spillway all around the Dam with concrete pads was installed. |
| Kathryn | Clean out creek and widen through the city of Kathryn. Water runoff from hills flows into the creek, the debris prevents the flow of water downstream which causes flooding of homes. | Flooding | Continue. Kathryn Project 3. |
| Leal | Generator for lift station during power outages. To prevent sewer backup into homes. | Flooding, and Communicable Disease | Delete. Does not apply as there is not a lift station in the community. Residents have septic systems. |
| Litchville | Litchville generator for lift station in power outages. To prevent sewer backup into homes. | Flood | Completed. Purchased and installed generator independently without grants or outside asst. |
| Nome | Nome street drainage project. To keep water from running into people's homes. | Flood | Completed. |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|-----------|---|------------------------------------|---|
| Oriska | Generator for lift station in power outages. To prevent sewer backup into homes and streets. | Flooding, and Communicable Disease | Continue. Administrative capabilities to apply for the grant was limited. Oriska Project 2. |
| Pillsbury | Generator and hookups for generator for lift station in power outages. To prevent sewer backup into homes. | Flooding, and Communicable Disease | Delete. Does not apply as there is not a lift station in the community. Residents have septic systems. |
| Sanborn | Sanborn ditch and drainage project. To prevent water in the streets from getting into homes. | Flood | Continue. |
| Sibley | Build a levee on the west side of town that is five feet wide, two feet high, and a ½ mile long. The levee would divert the runoff from the hills that flood town repeatedly. | Flooding | Continue. Partially completed as levee was built on the lake side of the city but not the west. The landowner to the west did not agree to allow the levee to be built on his land. Sibley Project 2. |
| Sibley | Grade raise of Lake Avenue along with the addition of three culverts. Divert runoff into town between homes. | Flooding | Cancel. Not feasible and only provides protection to properties on the lake side of the street. |
| Sibley | Build a retaining wall around the west side of the fire hall. This will divert the runoff away from the city's lift station which causes seepage. | Flooding | Cancel. Combined with Sibley Project 2 to reduce repetition. |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|-------------|---|----------------------|---|
| Sibley | Raise fire hall 2 ½ feet, fill in, and landscape. This would help divert water away from the lift station instead of letting it pool and seep into the lift station. | Flooding | Cancel. Cannot physically raise the Sibley Fire Hall. Not feasible. |
| Valley City | Provide hand washing education in schools. Provide automatic soap dispensers and paper towel dispensers in all public restrooms, including county schools, provide hand sanitizers and dispensers in public offices, classrooms, etc. | Communicable Disease | Continue. Barnes County Project 4. Valley City Project 3. |
| Valley City | Valley City NW storm sewer and retention basin. To still water so that storm sewers are not silted in. To control the amount of water flowing into storm sewers to prevent damage to sewers. | Flood | Continue. KLJ and previous public works director said the project wouldn't retain enough water. Valley City Project 11. |
| Valley City | Valley City Lagoon expansion project. To provide adequate space for sewage even in flood time. | Flood | Continue. New lagoon cell was built specifically for water treatment plant. Lagoon not built for city sewer. Valley City Project 18. |
| Valley City | Valley City Rainbow Bridge Replacement project. To prevent water from backing up behind the bridge and flooding upstream homes. | Flood | Completed. |
| Valley City | Valley City buyout of landslide and flood damage homes. To purchase homes in floodway, flood plain, or on landslide lots to protect people and give the river room to flood. | Flood | Ongoing and continue. Phase 1 of buyouts is ongoing, construction of dikes/flood control measures is ongoing. Valley City Projects 7 and 8. |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|-------------|---|-------------------------|--|
| Valley City | Infrastructure changes: Redoing 4 th and 5th Avenue truck route in Valley City to protect human life and lessen chance of spills in residential areas. | Hazardous Materials | Completed. |
| Valley City | Targeted patrols to protect human life. | National Security | Delete. Not mitigation. |
| Valley City | Replace warning sirens within the city limits (2). To reduce risk of not being able to hear warning for disasters. | All Hazards | Completed. 5 sirens have been installed. |
| Valley City | Construct permanent engineered flood control protection throughout Valley City on the Sheyenne River. | Flooding | Ongoing and continue. Some sections are completed, some in the construction phase and others proposed. Valley City Project 12. |
| Valley City | Install storm sewer (6th Avenue and Valley Avenue SE) to relieve storm water runoff reduce overland flooding to downstream properties. | Flooding, Summer Storms | Continue. Valley City Project 13. |
| Valley City | Replace lift station Lakeshore Acres. Threat of failure causing sanitary sewer backup into homes. | Communicable Disease | Completed. |
| Valley City | Replace existing 4” cast iron water mains to improve available water flow to fight residential fires. | Urban Fire | Ongoing and continue. Projects in northeast portion of city scheduled for 2015. 4 th Street South of downtown done. 10 blocks completed in 2014. Upgrading to 8” pipes. Valley City Project 14. |

Table 3.3 – 2010 Barnes County Multi-Hazard Mitigation Plan Mitigation Project Status – Continued

| Location | Project/Goal | Hazard Mitigated | 2015 Status |
|-------------|---|------------------------------------|---|
| Valley City | Repair erosion of drainage ditch to eliminate continued erosion of land next to ditch at lagoon. | Flooding, Summer and Winter Storms | Completed. |
| Valley City | To install 2 UPS battery backup systems and generator at PSAP/dispatch center to reduce risk of equipment failure due to power outage. | All Hazards | Completed. |
| Valley City | Replace undersized storm sewer mains from 10 th Avenue SW East to the river (6 blocks). To reduce street flooding. | Flooding, Summer and Winter Storms | Continue. Valley City Project 15. |
| Valley City | Reconstruct road, installation of underground storm sewer and grade change. Reduce ice buildup on 4 th Avenue SW from Winter Show Rd. North to Viking Drive. | Winter Storms | Completed. |
| Valley City | Remove old mill site buildings and structures from floodway to eliminate health hazards. | Communicable disease | Continue. Valley City Project 16. |
| Valley City | Along river bank on Main Street and in southwest part of Valley City. Install four new sluice gates along the Sheyenne River to eliminate river from backing up into the storm sewer. | Flooding | Completed. |
| Valley City | Expand of inert landfill to prevent water runoff and infiltration of ground water | Flooding, Summer and Winter Storms | Continue. Expanded in 2011, needs further expansion. Valley City Project 17. |
| Wimbledon | Wimbledon street drainage project. Drains standing water from town. To prevent water from streets from getting into homes. | Flood | Completed. Street drainage project was completed around 10 years ago. |

Planning Process Details

Included on the following pages is a summary of the planning process. More details of the meetings held are located in Appendix 5. Roughly two weeks prior to Planning Committee meetings, invitation postcards were sent via the postal service to local jurisdictions, stakeholders, agencies, and neighboring emergency managers, and news releases were sent to the local media. The week prior to the Planning Committee meetings, reminder emails were sent to the aforementioned parties. (See Appendix 3 for invite materials and documentation, and Appendix 4 for media coverage documentation.)

The first Barnes County Planning Committee Meeting was held on November 25, 2013, at the Barnes County Highway Department. At the November LEPC meeting, the LEPC accepted the responsibility of being the Planning Committee for the mitigation plan update. They identified stakeholders to participate in the plan updating process. Stakeholders were invited to attend all meetings. In addition, many were contacted to obtain information for the planning process. The Planning Committee met the months of November, February, March, May, July, August, September and October.

Discussion at the meeting included the purpose of mitigation and the update of the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan (MHMP), how the current mitigation plan is used, who needed to be involved in the planning process, how to get public involvement, when to hold meetings, and review of the 2010 Barnes County MHMP, an initial review of the county's and state's hazards and vulnerabilities, and identification of the processes and steps to be taken in the planning process.

The Planning Committee identified that the plan is for the 14 jurisdictions in the county: the Barnes County Commission, the cities of Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City and Wimbledon. Representatives from each jurisdiction were encouraged to be part of the planning process. Jurisdictional meetings would be held in each jurisdiction to conduct a specific risk assessment, identify vulnerable areas, assess level of readiness and preparedness, estimate potential losses from specific hazard events, decide on capacity and on how to allocate resources, and prioritize mitigation measures, actions, and projects for each jurisdiction. The Planning Committee voted that incorporated jurisdictions would be eligible for inclusion in the update upon completion of a jurisdictional meeting and not by representation at committee meetings.

The Planning Committee voted to make decisions in the planning process by a simple majority vote of committee members present. Committee members discussed how to gather the information needed to update the plan and how to garner public involvement. Letters, phone calls, and surveys were discussed. Other community and jurisdictional plans were discussed. The committee discussed that entities, such as school districts, park districts, water boards, rural electric cooperatives that can apply for FEMA grant funds.

After consideration of days for meetings, the committee voted to meet monthly from 6:30 to 8:30 p.m. on the fourth Monday of each month for planning meetings and public meetings. The committee identified the distance of travel required to attend all meetings could limit attendance and participation. To encourage public participation, the committee voted to hold all Planning Committee meetings at the Barnes County Highway Department in Valley City due to its central location.

The 2010 Barnes County MHMP was posted on the Barnes County website: <http://www.co.barnes.nd.us/Dept/emm/>. The resource from FEMA and N.D. Department of Emergency Services: Mitigation Ideas was also distributed and posted on the website: www.scdrc.org as a planning resource.

**Barnes County
EM
Emergency Management**

Community Preparedness

- CodeRed
- "Are You Prepared?"
Emergency Guide

Local Emergency Planning Committee

- 2013 Tier II Reports
- Hazardous Materials

Barnes County Emergency Operations Plans

- Emergency Operations Base Plan
- Evacuation and Shelter
- Shelter and Mass Care
- Hazard Mitigation Plan**

Resource Links

- North Dakota Department of Emergency Services
- Grand Forks National Weather Service
- Department of Homeland Security
- Federal Emergency Management Agency

Emergency Management is a coordinated effort of all agencies, coordinating a wide range of public programs to ensure that a high level of mitigation, response and recovery is achieved for known hazards. Continuous assessment and exercising is undertaken in the public sector. In doing this, a working relationship is formed between response agencies, such as fire, police, medical services, public health, and other agencies. These joint events bring each other's capabilities and limitations to the attention of all participants.

Kimberly Franklin, Director
Barnes County Emergency Management
E-Mail: kfranklin@barnescounty.us
Phone: (701) 845-8510
Fax: (701) 845-8533
1525 12th St. NW
Valley City, ND 58072

The Planning Committee had its first review of the Barnes County and jurisdictions' hazards. The committee compared the hazards and their rankings in the 2011 State of North Dakota MHMP and the 2014 State of North Dakota MHMP Draft to the county's 2010 identified hazards and rankings. The

committee compared the ranking of the frequency and likelihood of hazards in the state plan and in the 2010 county plan to the updated history and data. The Planning Committee voted on which hazards to exclude from the planning process and voted to include windstorm as a separate hazard in the update. (See Table 3.12)

The second meeting of the Barnes County Planning Committee was held on February 24, 2014, at the Barnes County Highway Department in Valley City. A news release was published in the Valley City Times-Record and the Litchville Bulletin. (See Appendix 4) A reminder email was sent out the day of the meeting. (See Appendix 3) Phone calls were made to LEPC members and the mayors and auditors of each jurisdiction as a postcard was not sent the week prior. The agenda included review of last meeting actions, discussion of the purpose of mitigation and the plan update, a review of the Barnes County Hazards, input from meeting participants on the Barnes County survey and public input strategy, review of the mitigation strategies in the 2010 MHMP and identification of vulnerabilities to specific hazards in the county.

At the meeting, Kantrud and Schwartz described how the Barnes County MHMP can be used as a tool for education of the public and use by jurisdictional officials and employees for decision making, planning and zoning, or for a capital improvements plan.

Per recommendations from the state and FEMA, public involvement was through a community survey, news releases, and information shared at community events. The Planning Committee created a survey for public outreach. Meeting participants also made changes to the survey. Participants agreed to distribute the survey through businesses, organizations, churches, and individuals.

The committee was divided into two groups where Kantrud and Schwartz identified areas of vulnerability, what has been done, and what should be done regarding impacts of hazards. Kantrud discussed communicable disease, shortage or outage of critical materials or infrastructure. Schwartz discussed flooding, severe winter weather, and dam failure.

The third meeting of the Barnes County Planning Committee was held March 24, 2014, at the Barnes County Highway Department in Valley City. A news release was emailed to Valley City Times-Record and the Litchville Bulletin on March 14, 2014. The news release was published in the Litchville Bulletin. (See Appendix 4) A reminder email was sent on March 17, 2014. (See Appendix 3) The agenda included welcome and introductions, review of mitigation and the Barnes County hazards, a discussion on geologic hazards and subsidence impacts, vulnerable areas to hazards in the county, an update on the survey, and the next steps in the planning process.

A definition of geologic hazards and subsidence, which encompasses landslides and earthquakes, and erosion was presented meeting participants. It was indicated that landslide only applies to the cities of Sibley and Valley City as earthquakes and erosion do not apply to Barnes County.

To identify areas of concern relating to impacts, the Planning Committee conducted a dot exercise. The committee placed sticky dots on areas where hazards have the greatest impact, cause the most amount of damage, are most vulnerable, and are most likely to experience issues in the future. Kantrud and Schwartz reviewed each dot and noted the details of each dot placement.

The committee meeting scheduled the next meeting from 6:30 p.m., May 19, 2014, which is the third Monday of the month, at the Barnes County Highway Department, as the fourth Monday is a holiday.

The fourth committee meeting for the update of the Barnes County MHMP was May 19, 2014, at the Barnes County Highway Department. A news release was emailed to the Valley City Times-Record and the Litchville Bulletin on May 5, 2014. (See Appendix 4) A reminder email was sent on March 13, 2014, to the Planning Committee. (See Appendix 3) The agenda included welcome and introductions, a presentation by Barnes County Emergency Manager Kim Franklin reviewing completed flooding mitigation projects since 2010, and a panel of guest speakers discussing various methods of mitigation for flooding.

The guest speaker panel featured the Baldhill Dam Manager, N.D. National Guard Office in Charge, Barnes County Rural Water District Manager, N.D. State Water Commission NFIP Coordinator, N.D. Department of Transportation District 2 Engineer, Barnes County Water Resource District Manager, and Barnes County Highway Department Superintendent. Each guest speaker provided information regarding mitigation done in their respective field pertaining to flooding to assist in the planning process for the plan update. Based on information presented, potential mitigation projects were discussed upon conclusion of the meeting with a few of the meeting participants. Mitigation projects were formulated from information by the guest speakers and are included in the mitigation strategy for the county shown in Chapter 6. **FEMA Hazard Mitigation Program Specialist Charlie Jackson attended the meeting.**

The fifth meeting of the Barnes County Planning Committee was held from 6:30 to 8:30 p.m., Monday, July 28, 2014, at the Barnes County Highway Department. A postcard reminder and email reminder was sent to the Planning Committee the week of July 14, 2014, and the week of July 21, 2014, respectively. (See Appendix 3) A news release was published in the Valley City Times-Record. (See Appendix 4) The agenda included welcome and introductions, an update on the progress of jurisdictional meetings, status of the 2010 mitigation plan projects, proposed mitigation projects from jurisdictional meetings, an update of the Barnes County Mitigation Survey, a presentation of information and statistics on railroads, a presentation of the 2014 North Dakota Highway Safety Plan by John Thompson, and a breakout session identifying mitigation projects based on the information presented.

Schwartz interviewed a representative from Canadian Pacific Railway and Mike Bachmeier, chief inspector for the Federal Railroad Administration, to gather information on transportation issues involving the railroad. Transport of freight railroad is an increasing concern among communities in Barnes County due to the boom in energy development in the western part of the state, which has drastically increased the number of trains carrying hazardous materials and chemicals in recent years.

John Thompson presented a PowerPoint presentation on the results of a strategic highway safety plan (SHSP). The SHSP is a statewide, coordinated safety plan providing a comprehensive framework and specific goals and objectives to reduce fatalities and serious injuries on all public roads. The presentation included a discussion on identified safety strategies, both behavioral and infrastructure, aimed at increasing safety on state and local roadways. Meeting participants conducted the risk assessment of transportation accident after the presentation by Thompson. Mitigation projects were taken from the SHSP and are included in the mitigation strategy for the county shown in Chapter 6.

The sixth meeting of the Barnes County Planning Committee was held from 6:30 to 8:30 p.m., Monday, August 25, 2014, at the Barnes County Highway Department. A postcard reminder and email reminder was sent to the Planning Committee the week of August 11, 2014, and the week of August 18, 2014, respectively. (See Appendix 3) A news release was published in the Litchville Bulletin. (See Appendix 4) The agenda included an update on the progress of the Barnes County Mitigation Survey, an update on the jurisdictional meetings, a presentation on and completion of the risk assessment of Barnes County hazards. The Planning Committee scored and ranked the hazards in Barnes County using the risk assessment handout shown in this chapter following Table 3.11.

The seventh meeting of the Barnes County Planning Committee was held from 6:30 to 8:30 p.m., Monday, September 22, 2014, at the Barnes County Highway Department. A postcard reminder and email reminder was sent to the Planning Committee the week of September 8, 2014, and September 15, 2014, respectively. (See Chapter 3) A second email reminder was sent the day of the meeting. A news release was published in the Valley City Times-Record and Litchville Bulletin. The agenda included welcome and introductions, results from the Barnes County Mitigation Survey, review of goals and projects, scoring and ranking of mitigation projects, and next steps in the planning process.

Schwartz presented the results from the Barnes County Mitigation Survey. A total of 302 responses were collected. (See Appendix 7) The Planning Committee reviewed the 2010 MHMP goals and revised the goals based on the planning process in previous committee meetings. Schwartz reviewed the STAPLEE method for scoring mitigation projects and scored one project with the Planning Committee as an example. The Planning Committee was divided into three groups and reviewed each mitigation strategy, and used the STAPLEE method.

The public hearing to review the draft of the Barnes County MHMP Update was held from 6:30 p.m. to 7 p.m., Monday, October 27, 2014, at the Barnes County Highway Department in Valley City. A postcard reminder was sent to members of the Local Emergency Planning Committee (LEPC), as well as the mayor and auditor of each of the 13 jurisdictions in Barnes County the week of October 13, 2014. An email reminder was sent the week of October 20, 2014. A hardcopy of the draft plan was made available at the Barnes County Highway Department, Barnes County Courthouse, and the Valley City City Hall, all located in Valley City. A digital copy of the plan was made available on the Barnes County and Valley City websites. An announcement was made on local radio stations, and a press release was published in the Litchville Bulletin. A press release describing the planning process for the updated plan was published in the Valley City Times-Record. The agenda included welcome and introductions, and review of public comments and incorporation into the plan. The comments received were as follows:

N.D. Department of Health. Commented on the need for a mitigation project addressing disposal of inert waste in the county. The Planning Committee formulated a mitigation project (Barnes County Project 15) based on this comment.

Valley City Police Department Police Chief Fred Thompson. Commented on the need for commentary about the oil boom across the state and how, as the jobs and support services spread across the state, significant population and job number increases are likely to occur in Barnes County. As an example the new plants being constructed in Spiritwood will bring in hundreds of jobs to the area, and it is reasonable to assume that some of those people will reside in Barnes County if they can find housing. Thompson also commented on Barnes County Bridges discussed in Chapter 4 of the plan and said

structurally deficient and functionally obsolete bridges should be listed. The more people who see that information the more pressure can be placed upon the system to get them fixed. Plan consultants recommended revising Chapter 4 and Barnes County Project 26 based on these comments.

South Central Dakota Regional Council Executive Director Deb Kantrud. Attending a meeting on October 21, 2014, in the city of Jamestown with the Jamestown/Stutsman Development Corporation and Cenex Harvest States officials. At the meeting, participants discussed the need for Barnes County to address the impact of the CHS Nitrogen Fertilizer Plant being constructed in the Spiritwood Industrial Park and the potential for new development. Plan consultants recommended revising Barnes County Project 9 based on this comment.

Jamestown/Stutsman Development Corporation CEO Connie Ova and Barnes County Commissioner Phil Leitner. Attended the Regional Council executive board and full board meeting on October 22, 2014. At the meeting, Ova and Leitner commented on CHS and the new development potentially occurring in Barnes County. Ova said that a crew camp with a capacity between 1,400 and 2,000 workers is scheduled for construction in Stutsman County adjacent to Barnes County in Spiritwood Township south of the industrial park. The crew camp is scheduled for construction beginning in 2015-2016. Plan consultants recommended revising Barnes County Project 9 based on this comment.

N.D. Department of Emergency Services. Indicated the need for mapping of critical facilities, infrastructure, businesses, and public assets to assist in mitigation planning. Plan consultants formulated a potential mitigation project based on this comment.

Litchville City Auditor Connie Smith. Submitted feedback on October 28, 2014, after the public hearing. Smith reviewed Chapter 4, Profile & Inventory; Chapter 6, Mitigation Strategy; and Chapter 7, Mitigation Capability Assessment. Smith said the chapters were good.

Central Valley Health District Regional Emergency Preparedness and Response Coordinator Frank Balak. Commented on page 4-15 that regarding cable services providers, a better choice of language used to describe them is the term “direct broadcast satellite service providers” to keep it generic instead of specifying a particular provider. Balak further suggested this section state there is not a cable TV provider in the jurisdiction as individual homes may choose to subscribe to direct broadcast satellite service providers or receive terrestrial television programming using an antenna to receive over the air programming. Balak said the change is needed as the satellite service providers are not cable TV providers in the traditional sense of that each house in neighborhood has a coaxial or fiber optic cable running to it from a central location. On page 4-23, Balak said the first sentence says there are two higher education schools in the county located in Valley City. The third sentence says there are not any higher education schools in Barnes County. Balak suggested that a revision of the second sentence should say there are no other higher education schools in the county. In Chapter 7 on page 7-17, Balak said that septic permits are a code requirement through public health, which Barnes County has adopted. Balak said a sentence explaining this should be added. Plan consultants recommended revising the plan based on comments submitted from Balak.

Barnes County Commissioner John Froelich. Commented that train derailments from trains with chemicals aboard are possible. Froelich said the plan should include mitigation projects addressing the

release of hazardous materials and transportation infrastructure. Plan consultants and the Planning Committee revised Barnes County Project 5 and Valley City Project 4 based on this comment.

Kathryn City Auditor Shirley Sivertson. Commented on the 2014 Barnes County Mitigation Plan Update. Sivertson said the plan seems like a good complete piece of materials. The city of Kathryn will do their best to see it through.

The public hearing was closed at 7 p.m.

The eighth Planning Committee meeting for the update of the Barnes County MHMP was held from 7:00 p.m. to 8:30 p.m. October 27, 2014 immediately following the public hearing at the Barnes County Highway Department in Valley City. A postcard reminder was sent to members of the Local Emergency Planning Committee (LEPC), as well as the mayor and auditor of each of the 13 jurisdictions in Barnes County the week of October 13, 2014. An email reminder was sent the week of October 20, 2014. A hardcopy of the draft plan was made available at the Barnes County Highway Department, Barnes County Courthouse, and the Valley City City Hall, all located in Valley City. A digital copy of the plan was made available on the Barnes County and Valley City websites. An announcement was made on local radio stations, and a press release was published in the Litchville Bulletin. A press release describing the planning process for the updated plan was published in the Valley City Times-Record. The agenda included: incorporation of public comments into the plan, review and scoring of additional mitigation projects, and review of jurisdictional participation in the plan. A motion was made and seconded to approve the public comments and incorporate them into the plan. The Committee voted and approved incorporation of the public comments into the plan. The motion was carried. Public comments resulted in the addition of two new mitigation projects and revision of two existing projects. Committee members reviewed and scored each new project and updated revised projects using the STAPLEE method. A motion was made and seconded to approve the addition of two new mitigation projects and revisions of two existing projects in the mitigation strategy. The Committee voted and approved the inclusion of two new mitigation projects and revision of two existing mitigation projects. The motion was carried. Schwartz presented a chart showing the participation of jurisdictions in committee meetings through the planning process. A motion was made and seconded to approve the participation of jurisdictions in the planning process. Committee members voted to approve jurisdictional participation in the plan and that all jurisdictions qualify to be part of the plan. The motion was carried. A motion was made and seconded to approve the Barnes County MHMP Update. The Committee voted to approve the Barnes County MHMP Update. The motion was carried.

The plan was presented to the Barnes County Commission on December 2, 2014 and was approved. The plan was submitted to the N.D. Dept. of Emergency Services on December 30, 2014.

Jurisdictional Meetings

Dazey: The Dazey City Council, mayor, fire district/department fire chief, and the Barnes County Emergency Manager participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on June 16, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and

the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. New development in the city includes: renovation of the community center using CDBG funds completed in 2014, lift station installed in 2011, connected to the rural water system in 2008, and new playground equipment in the city park in 2006. Meeting participants completed the 2015 Barnes County Mitigation Survey. Meeting participants identified future mitigation needs based on the risk assessment and formulated projects for the plan update. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Fingal: The Fingal City Council, mayor, and the Barnes County Emergency Manager participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on August 5, 2014. The meeting was called to order and facilitated by Daniel Schwartz. South Central Dakota Regional Council Administrative Assistant Georgia Miller assisted in facilitation. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Meeting participants identified future mitigation needs based on the risk assessment and formulated projects for the plan update. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Kathryn: The Kathryn City Council and mayor participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on July 16, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Geologic hazard was identified as not applicable to the city. Meeting participants identified the construction of a new fire hall in 2003 and the former bank being converted into a museum in 2014/2015. Meeting participants completed the 2015 Barnes County Mitigation Survey. Meeting participants identified future mitigation needs based on the risk assessment and formulated projects for the plan update. The city does not have ordinances that address natural and man-made hazards or a building inspector. Geologic hazard was identified as not applicable to the city.

Leal: The Leal City Council and mayor participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on July 8, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Meeting participants identified future mitigation needs based on the risk assessment and formulated projects for the plan update. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Litchville: The Litchville City Council and mayor participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on July 7, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Meeting participants identified future mitigation needs based on the risk assessment and formulated projects for the plan update. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Nome: The Nome City Council, mayor, and fire district/department chief participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on September 7, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Future mitigation projects were identified based

on the risk assessment. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Oriska: The Oriska City Council, mayor, and Barnes County Emergency Manager Kim Franklin participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on June 19, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Future mitigation projects were identified based on the risk assessment. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Pillsbury: The Pillsbury City Council, mayor, and Barnes County Emergency Manager Kim Franklin participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on June 23, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Future mitigation projects were identified based on the risk assessment. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Rogers: The Rogers City Council, mayor, fire district/department chief and assistant chief, park board member, and Barnes County Emergency Manager Kim Franklin participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on July 7, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked

by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Schwartz mailed 15 copies of the survey to Fire Chief Wanzek for completion by employees at ADM-Benson Quinn. Future mitigation projects were identified based on the risk assessment. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Sanborn: A member of the Sanborn City Council, Sanborn Fire Department volunteer, and Barnes County Emergency Manager Kim Franklin participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on September 15, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. Dam failure and geologic hazard were hazards identified as not applicable to the city. No new development has occurred in the city since the 2010 plan. Meeting participants completed the 2015 Barnes County Mitigation Survey. Future mitigation projects were identified based on the risk assessment. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Sibley: The Sibley City Council, mayor, fire department secretary, park board chairman and Barnes County Emergency Manager Kim Franklin participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on August 20, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. According to meeting participants, a vacant six-unit apartment building was recently renovated and is now occupied. In addition, lots on the north side of town were bought and a six to eight camp site is being building adjacent to the six-unit apartment building. Meeting participants completed the 2015 Barnes County Mitigation Survey. Future mitigation projects were identified based on the risk assessment. The city does not have ordinances that address natural and man-made hazards or a building inspector.

Valley City: South Central Dakota Regional Council Regional Planner Daniel Schwartz interviewed city staff and heads of specific departments to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on September 16, 2014. Due to the size of the city, a meeting with the city council, similar to other jurisdictions in the county, was not feasible.

Schwartz interviewed City-County Health Director Theresa Will to review projects from the 2010 MHMP and score and rank communicable disease. Schwartz and Will identified future mitigation projects for the city and county pertaining to communicable disease.

Schwartz interviewed personnel from the Valley City Public Works department to review projects from the 2010 MHMP and score and rank homeland security. Public works personnel identified capabilities of the city for all hazards except communicable disease, homeland security incident, urban fire/structure collapse and wildland fire. Schwartz and public works personnel identified future mitigation projects for the city and county pertaining to the hazards not scored by other city departments and staff.

Schwartz interviewed Valley City Police Department Police Chief Fred Thompson to review projects from the 2010 MHMP and score and rank homeland security. Thompson discussed capabilities of the city for homeland security and other hazards. Schwartz and Thompson identified future mitigation projects for the city and county pertaining to communicable disease.

Schwartz interviewed Valley City Fire Department Captain Ron Burchill to review projects from the 2010 MHMP and score and rank urban fire/structure collapse and wildland fire. Burchill discussed capabilities of the city for the hazards. Schwartz and Burchill identified future mitigation projects for the city and county pertaining to communicable disease.

Schwartz interviewed Valley City City Administrator Dave Schelkoph to review the profile of the city and inventory capabilities. The city has a building inspector, contract for engineer services, infrastructure maintenance programs in place, staff for grant writing purposes, planning and regulatory capabilities to guide development in place, ordinances to address storm water runoff, and adopted state building codes.

Surveys were emailed to major employers and entities in the city to increase public participation in Valley City. Surveys were emailed to Dakota Plains, Blue Cross Blue Shield, Drugs Plastics and Glass, Heartland Flax, FEI, Inc., KLJ, LaFarge Dakota, Sheyenne Care Center, Sanford Clinic, and Valley City Public Schools. Approximately 75 surveys were delivered to the John Deere Seeding Group location and 25 copies were delivered to Eagle Creek Software Services and Valley City City Hall.

Wimbledon: The Wimbledon City Council, mayor, fire department fire chief, assistant fire chief, volunteers, and Barnes County Emergency Manager Kim Franklin participated in the meeting to update the Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan on August 4, 2014. The meeting was called to order and facilitated by Daniel Schwartz. The agenda included: introductions and sign-in, the purpose of mitigation and review of Barnes County hazards, review of jurisdiction projects from the 2010 MHMP, review of community inventory and capabilities, scoring and ranking of hazards, consideration of future mitigation needs and the Barnes County survey. (See Appendix 5 Meeting Notes, Chapter 4 Profile and Inventory, Chapter 8 Jurisdictions)

The city council and mayor reviewed the mitigation projects from the previous plan for the city and discussed information to develop the community profile and inventory. Hazards were scored and ranked by city council members. According to meeting participants, the former school was converted into an apartment building with five rental units and one owner-occupied unit. The city also updated its trailer park ordinances. Meeting participants completed the 2015 Barnes County Mitigation Survey. Future

mitigation projects were identified based on the risk assessment. The city does not have ordinances that address natural and man-made hazards aside from trailer park ordinances and does not have an inspector.

Roles and Responsibilities

Table 3.4 indicates who participated and how they participated in the mitigation planning process from each Barnes County jurisdiction in 2010 and 2015.

Table 3.4 – Jurisdictional Participation in Planning Process

| Jurisdictions Represented | Name and Title | Form of Participation | Status of Plan Participation |
|----------------------------------|---|---|-------------------------------------|
| Barnes County | Kim Franklin Emergency Manager | Comments Information Review Survey | 2010, 2015 |
| Barnes County | Eldred Knutson Barnes County Commissioner | Comments Information Review Survey | 2015 |
| Barnes County | Scott Miller Barnes County Ambulance Director | Comments Information Survey | 2015 |
| Barnes County/ Valley City | Theresa Will City-County Health Director | Comments Information Survey | 2010, 2015 |
| Barnes County | Betty Koslofsky Tax Director | Comments Information | 2010, 2015 |
| Barnes County | Bruce Anderson Barnes Co. Water Resource District Mgr. | Comments Information | 2015 |
| Barnes County | Rodger Berntson Barnes County Commissioner | Comments Information Survey | 2010, 2015 |
| Barnes County | Phil Leitner Barnes County Commissioner | Comments Information Survey | 2015 |
| Barnes County | John Froelich Barnes County Commissioner | Comments Information Survey | 2010, 2015 |
| Barnes County | Kerry Johnson Barnes County Highway Superintendent | Comments Information | 2015 |
| Barnes County | Scott Miller Barnes County Ambulance Director | Comments Information Survey | 2015 |
| City of Dazey | Gary Hare Dazey Mayor | Comments Information Survey | 2015 |
| City of Dazey | Darlene Hare Dazey Auditor | Comments Information Survey | 2010, 2015 |

Table 3.4 – Jurisdictional Participation in Planning Process - Continued

| Jurisdictions Represented | Name and Title | Form of Participation | Status of Plan Participation |
|----------------------------------|--|-----------------------------------|-------------------------------------|
| City of Dazey | Barbara Heinze Dazey City Council member | Comments Information Survey | 2015 |
| City of Dazey | Adam Mashburn Dazey City Council member elect | Comments Information Survey | 2015 |
| City of Dazey | Daryl Kunze Dazey Fire Department and Dazey Rural Fire District Fire Chief | Comments Information Survey | 2015 |
| City of Fingal | John Behm Fingal Mayor | Comments Information Survey | 2015 |
| City of Fingal | Corinne Ertelt Fingal Auditor | Comments Information Survey | 2010, 2015 |
| City of Fingal | Terri L. Meyer Fingal City Council member | Comments Information Survey | 2015 |
| City of Kathryn | Paul Fisher Kathryn Mayor and Water Operator | Comments Information Survey | 2015 |
| City of Kathryn | Kathryn Auditor Shirley Sivertson | Comments Information Survey | 2010, 2015 |
| City of Kathryn | Jim Gilbertson City Council member | Comments Information Survey | 2015 |
| City of Kathryn | Duane Pollert City Council member | Comments Information Survey | 2015 |
| City of Kathryn | Ruth Nelson City Council member | Comments Information Survey | 2015 |
| City of Kathryn | Delray Trzruc City Council member | Comments Information Survey | 2015 |
| City of Leal | David Lokken, Jr. Mayor | Comments Information Survey | 2015 |
| City of Leal | Steve Udem City Alderman | Comments Information Survey | 2015 |
| City of Leal | Mary Udem Auditor | Comments Information Survey | 2010, 2015 |

Table 3.4 – Jurisdictional Participation in Planning Process - Continued

| Jurisdictions Represented | Name and Title | Form of Participation | Status of Plan Participation |
|---------------------------|--|-----------------------------------|------------------------------|
| City of Litchville | Brad Botner Mayor Litchville Fire Department | Comments Information Survey | 2015 |
| City of Litchville | Connie Smith Auditor | Comments Information Survey | 2010, 2015 |
| City of Nome | Jennifer Capman City Alderman | Comments Information Survey | 2015 |
| City of Nome | Lance Capman Mayor | Comments Information Survey | 2015 |
| City of Nome | Bruce Storhoff City Alderman | Comments Information Survey | 2015 |
| City of Nome | Charles Russell City Alderman | Comments Information Survey | 2015 |
| City of Oriska | Rick Pommerer Mayor | Comments Information Survey | 2015 |
| City of Oriska | Katie Pommerer Auditor | Comments Information Survey | 2015 |
| City of Oriska | Rob Marshall City Council member | Comments Information Survey | 2015 |
| City of Oriska | Buck Trader Oriska Fire Department Fire Chief | Comments Information | 2015 |
| City of Pillsbury | Dan Lindsith Mayor | Comments Information Survey | 2015 |
| City of Pillsbury | Dennis McGuire Auditor | Comments Information Survey | 2015 |
| City of Pillsbury | Jim Volk Alderman | Comments Information Survey | 2015 |
| City of Pillsbury | Carol McGuire Alderman | Comments Information Survey | 2015 |
| City of Rogers | Lynn Koebernick Mayor | Comments Information Survey | 2015 |
| City of Rogers | Tina Vincent Auditor | Comments Information Survey | 2015 |

Table 3.4 – Jurisdictional Participation in Planning Process - Continued

| Jurisdictions Represented | Name and Title | Form of Participation | Status of Plan Participation |
|---------------------------|---|-----------------------------------|------------------------------|
| City of Rogers | Gordon Johnson City Council member Rogers Volunteer Fire Department Assistant Fire Chief | Comments Information Survey | 2015 |
| City of Rogers | Fred Wanzek City Council member Rogers Volunteer Fire Department Fire Chief | Comments Information Survey | 2015 |
| City of Rogers | Arvin Hoffman City Council member | Comments Information Survey | 2015 |
| City of Rogers | Kaye Omdahl City Council member Rogers Park Board member | Comments Information Survey | 2015 |
| City of Sanborn | Jim Berntson Sanborn Fire Department Volunteer | Comments Information Survey | 2015 |
| City of Sanborn | Kim Franklin Barnes County Emergency Manager City Alderman | Comments Information Survey | 2015 |
| City of Sibley | Allen Bender Mayor | Comments Information Survey | 2015 |
| City of Sibley | Dave Blaser City Council member | Comments Information Survey | 2015 |
| City of Sibley | Conrad Huber Public | Comments Survey | 2015 |
| City of Sibley | Janice Huber Public | Comments Survey | 2015 |
| City of Sibley | Typhanny Schuler Auditor, Sibley Fire Department Secretary | Comments Information Survey | 2010, 2015 |
| City of Sibley | Rhonda Will Sibley Park Board Chairman | Comments Information Survey | 2015 |
| City of Valley City | Ron Burchill Valley City Fire Department Captain | Comments Information Survey | 2015 |
| City of Valley City | Jeff Differding Valley City Public Works Operations Specialist | Comments Information | 2015 |
| City of Valley City | Stanley Hansen Electrical Superintendent | Comments Information | 2015 |

Table 3.4 – Jurisdictional Participation in Planning Process - Continued

| Jurisdictions Represented | Name and Title | Form of Participation | Status of Plan Participation |
|----------------------------------|---|-----------------------------------|-------------------------------------|
| City of Valley City | Wade Hesch Valley City Public Works Water Treatment Plant Superintendent | Comments Information | 2015 |
| City of Valley City | Dave Schelkoph Valley City Administrator | Comments Information Survey | 2015 |
| City of Valley City | Fred Thompson Valley City Police Department Chief of Police | Comments Information Survey | 2015 |
| City of Valley City | Theresa Will City-County Health Department Director | Comments Information Survey | 2015 |
| City of Wimbledon | Leon Doyle Wimbledon Auditor | Comments Information Survey | 2010, 2015 |
| City of Wimbledon | Roger Pickar Wimbledon Mayor | Comments Information Survey | 2015 |
| City of Wimbledon | Kurt Wagner Wimbledon Fire Department Fire Chief | Comments Information Survey | 2015 |
| City of Wimbledon | Steve Guscette City Council member | Comments Information Survey | 2015 |
| City of Wimbledon | Chad Bakken City Council member, Wimbledon Fire Department Fireman | Comments Information Survey | 2015 |
| City of Wimbledon | Mark McClean Wimbledon Fire Department Assistant Fire Chief | Comments Information Survey | 2015 |

As part of the planning process and the gathering of information for the updating of the risk assessment, emergency managers from the neighboring counties were invited to all committee meetings and were sent a link to review the draft Barnes County Multi-Jurisdictional Multi-Hazard Mitigation Plan.

Table 3.5 – Participation of Neighboring Emergency Services

| County | Name and Title | Invited form of Participation | Status of Plan Participation |
|-----------------|--|--------------------------------------|-------------------------------------|
| Cass County | Dave Rogness Cass County Emergency Manager | Review | 2015 |
| Griggs County | Robert Hook Griggs County Emergency Manager | Review | 2015 |
| LaMoure County | Kimberly Robbins LaMoure County Emergency Manager | Review | 2015 |
| Ransom County | Tricia Kiel Ransom County Emergency Manager | Review | 2015 |
| Steele County | Kim Franklin Steele County Emergency Manager | Review | 2015 |
| Stutsman County | Jerry Bergquist Stutsman County Emergency Manager | Review | 2015 |

Additional participants in the plan development are listed in the table below; each was also allowed the opportunity to comment on the plan.

Table 3.6 – Federal, State, Regional, Local and Business Participation in Planning Process

| Representing | Entity | Name Title/Division | Form of Participation | Status of Plan Participation |
|---------------------|-------------------------------|---------------------------------------|-----------------------------------|-------------------------------------|
| Business/Industry | McGuire's Pub and Grub | Carol McGuire, Owner | Comments Information Survey | 2015 |
| Business/Industry | ADM Benson-Quinn | Fred Wanzek, Supervisor | Comments Information Survey | 2015 |
| Business/Industry | John Deere Seeding Group | Jill Molder, Human Resources | Survey Information | 2015 |
| Business/Industry | FEI, Inc. | Matt Klabo, VP Fertilizer Division | Survey | 2015 |
| Business/Industry | Agroline, Inc. | Roger Pickar, Supervisor | Survey Information | 2015 |
| Business/Industry | Dakota Plains Cooperative | Ken Astrup, Human Resources | Survey | 2015 |
| Business/Industry | Blue Cross Blue Shield | Linda Skramstad Human Resources, | Survey | 2015 |
| Business/Industry | Drug Plastics and Glass | Krystle Hartsell, Human Resources | Survey | 2015 |
| Business/Industry | Eagle Creek Software Services | Jeff Rash, Human Resources | Survey | 2015 |
| Business/Industry | Heartland Flax | Tara Anderson, Export Manager | Survey | 2015 |
| Business/Industry | LaFarge Dakota | Andrea Larson, Human Resources | Survey | 2015 |
| Business/Industry | Sheyenne Care Center | Craig Christianson, CEO | Survey | 2015 |

Table 3.6 – Federal, State, Regional, Local and Business Participation in Planning Process - Continued

| Other Participation | Representing | Name Title/Division | Form of Participation | Status of Plan Participation |
|----------------------------------|--|--|-----------------------------------|-------------------------------------|
| Business/Industry | Sanford Clinic | Linda Lane, Head Nurse | Survey | 2015 |
| Business/Industry | Valley City Public School | Dean A. Koppelman, Superintendent | Survey | 2015 |
| Business/Industry | KLJ Engineering | Chad Peterson, Engineer | Comments Information | 2015 |
| Business/Industry | Valley City State University | Ron Pommer, Director of Facilities | Comments Information | 2015 |
| Economic Development Corporation | Valley City Development Group | Jennifer Feist, Director of Development | Comments Information | 2015 |
| Federal | Farm Services Agency | Judy Nohrenberg, County Executive Director | Comments Information | 2015 |
| Federal | National Weather Service | Greg Gust , Meteorologist-In-Charge | Comments Information | 2015 |
| Federal | U.S. Army Corps of Engineers | Rich Schueneman, N.D. Flood Control Project Section Supervisor and Baldhill Dam Manager | Comments Information | 2015 |
| Federal | FEMA | Charlie Jackson, Hazard Mitigation Program Specialist | Comments Information | 2015 |
| Federal | U.S. Department of Agriculture, Risk Management Agency | Faron Thompson, Risk Management Analyst | Comments Information | 2015 |
| Federal | U.S. Geological Survey | Ed Murphy, Mineral Resources | Information | 2015 |
| Federal | U.S. Department of Agriculture, Natural Resources Conservation Program | Erica Althoff, Area Engineer | Comments Information Survey | 2015 |
| Federal | U.S. National Guard | Major Anna Wittrock, Office in Charge | Comments Information | 2015 |
| Local | Barnes County Highway Department | Kerry Johnson, Barnes County Highway Superintendent | Comments Information Survey | 2015 |
| Local | Barnes County Highway Department | Jamie Smith, Administrative Asst. III | Comments Information | 2015 |
| Local | Valley City Times-Record | Heidi Harris, Reporter | Information | 2015 |

Table 3.6 – Federal, State, Regional, Local and Business Participation in Planning Process - Continued

| Other Participation | Representing | Name Title/Division | Form of Participation | Status of Plan Participation |
|----------------------------|---|---|------------------------------|-------------------------------------|
| Local | Barnes County | Betty Koslofsky, Tax Director / Planning and Zoning Administrator | Comments Information | 2015 |
| Local | Barnes County | Karen Duffy, Barnes County Auditor's Office-Administrative Assistant | Comments Information | 2015 |
| Local | Barnes County Water Resource District | Bruce Anderson, Manager | Comments Information | 2015 |
| Local | Barnes County Water Resource District | Linda McKenna, Secretary/Treasurer | Comments Information | 2015 |
| Local | Barnes County | Rodger Berntson, County Commissioner | Comments Information | 2015 |
| Local | Barnes County | Eldred Knutson, County Commissioner | Comments Information | 2015 |
| Local | Barnes County | Phil Leitner, County Commissioner | Comments Information | 2015 |
| Local | Barnes County Rural Water District | Perry Kapaun, Manager | Comments Information | 2015 |
| Regional | Central Valley Health District | Frank Balak Regional Emergency Preparedness and Response Coordinator | Comments Information | 2015 |
| State | N.D. Association of Counties | Jeff Eslinger Communications Manager | Comments Information | 2015 |
| State | N.D. Aeronautics Commission | Website | Information | 2015 |
| State | N.D. League of Cities | Jerry Hjemplstad, Staff Attorney and Deputy Director | Comments Information | 2015 |
| State | N.D. Department of Mineral Resources | Elroy Kadrmas, GIS Specialist | Information | 2015 |
| State | N.D. Department of Transportation | John Thompson, District 2 Engineer | Comments Information | 2015 |
| State | N.D. State Water Commission | Jeff Klein, NFIP Coordinator | Comments Information | 2015 |

Public Participation and Comment Integration

All planning meetings were open to the public. In addition, one public meeting was held. The public meeting was held on October 27, 2014, at the Barnes County Highway Department in Valley City. The agenda for the public meeting included review and acceptance of public comments. See Appendix 5 for meeting notes.

Representatives from various state and local agencies were invited to attend the fourth LEPC Meeting on May 19, 2014, at the Barnes County Highway Department as this meeting focused specifically on flooding and dam failure. The LEPC said inviting these entities to participate were crucial to understanding the impact from these hazards. Schwartz contacted and invited the following to attend the meeting: John Thompson, District Engineer at the North Dakota Department of Transportation, District 2 office; Major Anna Wittrock, officer in charge at the National Guard in Valley City; Rich Schueneman, Baldhill Dam Manager at the United States Army Corp of Engineers field office in Valley City; Bruce Anderson, Manager at the Barnes County Water Resource District; Ken Evenson, Vice President at the Barnes County Water Resource District; Kerry Johnson, County Road Superintendent for the Barnes County Highway Department; Gene Vaneekhout, North Dakota Game and Fish Department; Erica Althoff, Area Engineer at the Natural Resources Conservation Service; Jeff Klein, NFIP Coordinator at the North Dakota State Water Commission; and Perry Kapaun, Manager at the Barnes Rural Water District. All invitees confirmed attendance. Invitations were sent to these representatives to ensure the public was involved in the planning process during the drafting stage.

Kantrud attended the annual spring meeting of Barnes County Township Officers Association (BCTOA). Kantrud discussed the process to update the Barnes County MHMP and the impacts involved with each hazard identified for the update. The Barnes County Multi-Hazard Mitigation Survey (MHMS) was distributed to participants with 28 copies completed and given to Kantrud. Kantrud attended the BCTOA to ensure public participation during the drafting stage of the plan.

Community Hazard Mitigation Survey

A two-page Barnes County Community Hazard Survey was created by the plan consultant, emergency manager, and the LEPC for distribution to encourage more public input. Hundreds of surveys were distributed to meetings, businesses, churches, employers, community organizations, and community events. Three hundred and two surveys were returned. Of the 302 surveys, 288 were residents of Barnes County, which represented 6.0 percent of all households in the county based on the 2010 U.S. Census. See Appendix 7 for complete survey results. Plan consultants contacted and send the survey to major employers, businesses and organizations to increase survey participation. See Table 3.6 for detailed participation. The Barnes County MHMS was added to the South Central Dakota Regional Council's website on March 28, 2014. At the Planning Committee Meeting on March 24, 2014, the mayor of Fingal and the mayor of Sibley requested that 50 copies of the survey be mailed to them for distribution in their communities.

To further increase public participation and outreach, plan consultants contacted major employers and organizations in Valley City for distribution of the survey. Electronic copies of the survey were emailed to Dakota Plains Cooperative, Blue Cross Blue Shield, Drug Plastics and Glass, Heartland Flax, FEI, Inc., KLJ Engineering, LaFarge Dakota, Sheyenne Care Center, Sanford Clinic, and Valley City Public

Schools. In addition, prior to the Fingal Jurisdictional Meeting, approximately 75 copies of the survey were delivered to John Deere Seeding Group and Eagle Creek Software Services each, and 25 were delivered to the city hall in Valley City.

A majority of survey respondents, 52 percent, have lived in Barnes County for more than 16 years and another 20 percent have lived in the county for one to five years. Approximately 79 percent of respondents have been affected by winter storms, followed by summer storms and flooding both at 56 percent, and windstorm at 45 percent. Dam failure and homeland security incident were identified as the hazards affecting the least amount of respondents with one percent of respondents, respectively. Winter storms, flooding and summer storms were identified as top three major concerns from respondents at 57 percent, 44 percent and 32 percent, respectively.

Table 3.7 shows the amount of damage respondents identified in the past five years impacting their household.

Table 3.7 – Monetary Damage Experienced by Households in Barnes County

| How much monetary damage has your household experienced due to the natural or man-made disasters in the last 5 years? | | |
|--|------------------------------|----------------|
| Damage Range | Number of Respondents | Percent |
| <\$500 | 35 | 12% |
| <\$1,000 | 57 | 19% |
| <\$10,000 | 73 | 24% |
| <\$25,000 | 17 | 6% |
| <\$50,000 | 4 | 1% |
| >\$100,000 | 1 | 0% |
| None | 96 | 32% |
| No Answer | 19 | 6% |

Source: Barnes County Multi-Hazard Mitigation Survey

Table 3.8 shows the response to the question asking the type of mitigation actions that would help defend against natural and man-made disasters.

Table 3.8 – Changes or Additions Survey Respondents Would Make to Their Community

| Are there any changes or additions to your community that in your opinion would help defend against or help cope with natural or man-made disasters? (example shelters, generators, sirens, road grade raises) | | |
|---|------------------------------|----------------|
| Change or Addition | Number of Respondents | Percent |
| Clear roads/Snow removal | 6 | 2% |
| Dikes | 32 | 11% |
| Generators | 46 | 15% |
| No Answer | 173 | 57% |
| Notification phone calls | 8 | 3% |
| Road grade raises | 18 | 6% |
| Sirens | 34 | 11% |
| Supportive resources | 11 | 4% |
| Water | 1 | 0% |

Source: Barnes County Multi-Hazard Mitigation Survey

A majority of survey respondents did not answer the question. Approximately 15 percent of survey respondents indicated generators as mitigation actions that would help defend against natural and man-made disasters, followed by dikes and sirens at 11 percent each.

Approximately 47 percent of survey respondents indicated they were interested in receiving information on protecting their household against natural or man-made disasters while 43 percent said no and 10 percent did not answer the question.

Table 3.9 shows how individuals who said they would like to receive information would prefer to have the information delivered to their household. Not one form of communication was prevalent over the other. Approximately 17 percent indicated written correspondence as the preferred method, followed by newspaper and website with 15 percent each, radio and television with 13 percent each and smart phone/tablet with 11 percent. Only six percent of respondents indicated social media as the preferred method. Approximately 48 percent of respondents did not answer the question.

Table 3.9 – Method by Which Survey Respondents Would like to Receive Information

| If yes, how would you like to receive that information? | | |
|--|------------------------------|----------------|
| Source | Number of Respondents | Percent |
| E-mail | 36 | 12% |
| Newspaper | 45 | 15% |
| Radio | 39 | 13% |
| Smartphone/Tablet | 32 | 11% |
| Social media | 18 | 6% |
| Television | 39 | 13% |
| Website | 44 | 15% |
| Written correspondence | 50 | 17% |
| No Answer | 144 | 48% |

Source: Barnes County Multi-Hazard Mitigation Survey

Table 3.10 shows the response to the question if familiarity with shelter-in-place. A majority of respondents, 68 percent, indicated they were not familiar with shelter-in-place.

Table 3.10 – Are you Familiar with Shelter-in-Place?

| Are you familiar with Shelter-in-Place? | | |
|---|-----------------------|---------|
| Response | Number of Respondents | Percent |
| Yes | 77 | 25% |
| No | 205 | 68% |
| No Answer | 20 | 7% |

Source: Barnes County Multi-Hazard Mitigation Survey

The information from the survey was incorporated into the mitigation strategies for education. It will also be used for future surveys to gather data from the public in the updating process of the county’s mitigation plan.

Review and Incorporation of Existing Plans and Information

The Barnes County plan was developed with the consultation of local, state and federal agencies, local businesses, educational institutions, and nonprofits. The committee reviewed information from their plans and programs and used this information in this plan document. The plans and organizations consulted and the information used in this plan document are identified in Table 3.11. The information gathered from these sources was used in the profile of the county and each community to identify capacity, vulnerabilities, hazards, and threats to complete the risk assessment and identify mitigation strategies and who would be responsible to implement the action, partners, and sources of funding for the projects.

Table 3.11 – Existing Plans and Information Incorporated into Plan

| Organization | Existing Plans and Information |
|--|---|
| Barnes County Emergency Manager | <ul style="list-style-type: none"> • Barnes County Emergency Operations Plan • Accident Reports • Emergency Action Plan-Baldhill Dam |
| Barnes County Highway Department | <ul style="list-style-type: none"> • Capital improvements information • Hazardous areas information |
| Barnes County Multi-Hazard Mitigation Plan, 2010 | <ul style="list-style-type: none"> • Reviewed and Updated |
| Barnes County Tax Equalization | <ul style="list-style-type: none"> • Maps and Statistics |
| City-County Health District | <ul style="list-style-type: none"> • Information and Statistics |
| Litchville Bulletin | <ul style="list-style-type: none"> • Photos and County Hazard History Events |
| Mercy Hospital | <ul style="list-style-type: none"> • Health Care Services and Statistics |
| Montana-Dakota Utilities Co. | <ul style="list-style-type: none"> • Natural Gas Statistics |
| National Climatic Data Center (NCDC) | <ul style="list-style-type: none"> • Weather Event History Data |
| National Oceanic and Atmospheric Administration (NOAA) Satellite and Information Service | <ul style="list-style-type: none"> • Weather Event History Data • Snowfall History • Climatological Data • Tornado Statistics and Information |
| National Register of Historic Places | <ul style="list-style-type: none"> • Historic Sites |

Table 3.11 – Existing Plans and Information Incorporated into Plan - Continued

| Organization | Existing Plans and Information |
|---|---|
| National Weather Service | <ul style="list-style-type: none"> • Weather Event History Data • North Dakota Fire Danger Index |
| North Dakota Association of Counties | <ul style="list-style-type: none"> • County Jurisdiction Statistics |
| North Dakota Department of Emergency Services | <ul style="list-style-type: none"> • Technical Assistance Provided • THIRA • Information/Data |
| North Dakota Department of Health | <ul style="list-style-type: none"> • Disease Prevention/Statistics • Public Health • Influenza History • Terrorism Information |
| North Dakota Department of Transportation | <ul style="list-style-type: none"> • North Dakota Department of Transportation, TransAction III, North Dakota’s Statewide Strategic Transportation Plan 2012, North Dakota Rail Plan 2007 • Traffic accident history • Strategic Highway Safety Plan |
| North Dakota Forest Service | <ul style="list-style-type: none"> • Wildfire Data and Statistics |
| North Dakota Game and Fish | <ul style="list-style-type: none"> • Wildlife Data and Statistics |
| North Dakota League of Cities | <ul style="list-style-type: none"> • Technical Assistance Provided • Jurisdiction Statistics |
| North Dakota Multi-Hazard Mitigation Plan, March 2011 and 2014 | <ul style="list-style-type: none"> • State Mitigation Plan |
| North Dakota State Fire Marshal’s Office | <ul style="list-style-type: none"> • National Fire Incident Reporting Program |
| North Dakota State Water Commission | <ul style="list-style-type: none"> • Dam Safety • National Flood Insurance Program • Drought Disaster • Flood Control |
| Otter Tail Power Company | <ul style="list-style-type: none"> • Power Outage Statistics |
| South Central Dakota Regional Council | <ul style="list-style-type: none"> • Economic Development • Housing Needs Assessment for The North Dakota Planning Region VI |
| Spatial Hazard Events and Losses Database for the United States (SHELDUS) | <ul style="list-style-type: none"> • Weather Event History Data • Weather Descriptions |
| U.S. Census 2010/American Community Survey | <ul style="list-style-type: none"> • Demographic Data and Statistics |
| U.S. Centers for Disease Control and Prevention (CDC) | <ul style="list-style-type: none"> • Disease Control • Disease Transmission |
| U.S. Department of Agriculture-Risk Management Agency | <ul style="list-style-type: none"> • Crop Loss Data and Statistics |
| U.S. Drought Monitor | <ul style="list-style-type: none"> • Drought Statistics |
| U.S. Fish and Wildlife Service, North Dakota Field Office | <ul style="list-style-type: none"> • Endangered Species Data |
| U.S. Geological Survey | <ul style="list-style-type: none"> • Geologic Research and Statistics |
| Valley City Fire Department | <ul style="list-style-type: none"> • Fire Incident Statistics |
| Valley City Times-Record | <ul style="list-style-type: none"> • Photos and County Hazard History Events |

Information in this mitigation plan will be incorporated into the county’s emergency operations plan, plans for Mercy Hospital and City-County Health, and planning and zoning for Barnes County and the city of Valley City.

Risk Assessment Methodologies

The methodology for assessing risks involved looking at each identified hazard and threat in Barnes County separately and looking at what it will do to the community. Each jurisdiction scored impact, frequency, likelihood, and vulnerability and capability using the following scoring criteria. The plan consultant scored capability based on the same criteria independently after each jurisdictional meeting.

Impact is what damage or losses the hazard causes in a community.

| | |
|----------|---|
| Scored 1 | Negligible – less than 10% of the jurisdiction affected |
| Scored 2 | Limited – 10% to 25% of jurisdiction affected |
| Scored 3 | Critical – 25% to 50% of the jurisdiction affected |
| Scored 4 | Catastrophic – More than 50% of the jurisdiction affected |

Impact per hazard: Ranked _____. Why:

Frequency is how often the hazard occurs.

| | |
|----------|---|
| Scored 1 | Unlikely – history of events shows less than 1% chance hazard will occur |
| Scored 2 | Possible – history of events shows between 1% to 10% chance hazard will occur |
| Scored 3 | Likely – history of events shows between 10% to 100% chance hazard will occur |
| Scored 4 | Highly likely – history of events shows nearly 100% chance hazard will occur |

Frequency per hazard: Ranked _____. Why:

Likelihood is how probable it is that the hazard will happen.

| | |
|----------|--|
| Scored 1 | Unlikely – less than 1% chance hazard will occur |
| Scored 2 | Possible – 1% to 10% chance hazard will occur |
| Scored 3 | Likely – 10% to 100% chance hazard will occur |
| Scored 4 | Highly likely – Nearly 100% chance hazard will occur |

Likelihood per hazard: Ranked _____. Why:

Vulnerability is the amount of

1. vulnerable areas, such as trailer courts, building construction, and blocked roads and
2. vulnerable population, individuals with special needs, elderly, day cares, and schools

Who and what is affected? When? Identify specific areas of vulnerability. Who will handle dealing with the hazard impact? What you have or lack: equipment, vehicles, services available, shelters, buildings, and infrastructure.

| | |
|----------|---|
| Scored 1 | Low vulnerability: Adequate resources in the jurisdiction to address any hazard |
| Scored 2 | Moderate vulnerability: Various resources in the jurisdiction |
| Scored 3 | Highly vulnerability: Few resources in the jurisdiction |
| Scored 4 | Very high vulnerability: Little to no resources in the jurisdiction |

Capability is the ability to protect itself against the hazard with resources (i.e. buildings, infrastructure, equipment, personnel, plans, technical, financial/tax base)

- Scored 1 Low capability: Little to no ability of the jurisdiction for mitigation
- Scored 2 Moderate capability: Few abilities of the jurisdiction for mitigation
- Scored 3 High capability: Various abilities of the jurisdiction for mitigation
- Scored 4 Very high capability: Adequate abilities of the jurisdiction for mitigation

Capability per hazard: Ranked _____. Why:

Hazard Identification

Table 3.12 shows the hazards included in the plan, how identified and why identified to be included in the plan.

Table 3.12 – Barnes County Major Hazards

| Hazard Profile | How Identified | Why Identified |
|---|--|---|
| Communicable Disease (including human, animal, and plant disease) | <ul style="list-style-type: none"> • N.D. Department of Agriculture • N.D. Department of Health • U.S. Department of Agriculture-Risk Management Agency | <ul style="list-style-type: none"> • Agricultural community • Disease statistics for Barnes County |
| Dam Failure | <ul style="list-style-type: none"> • U.S. Army Corps of Engineers • National Inventory of Dams • Association of State Dam Safety | <ul style="list-style-type: none"> • 18 dams located in county, including one significant hazard dam, dams located outside county could have potential impact |
| Drought | <ul style="list-style-type: none"> • National Climatic Data Center • U.S. Drought Monitor • U.S. Department of Agriculture | <ul style="list-style-type: none"> • Drought history • Current drought conditions • Presidential Disaster Declarations • Agricultural community |
| Geologic Hazard (Landslide) | <ul style="list-style-type: none"> • Barnes County Emergency Manager | <ul style="list-style-type: none"> • Landslide history |
| Flood | <ul style="list-style-type: none"> • National Climatic Data Center • Barnes County Emergency Manager • National Weather Service | <ul style="list-style-type: none"> • History events • Presidential Disaster Declarations • County flooding events |

Table 3.12 – Barnes County Major Hazards - Continued

| Hazard Profile | How Identified | Why Identified |
|--|--|---|
| Hazardous Material Release | <ul style="list-style-type: none"> • Barnes County Emergency Manger • N.D. Department of Transportation • Farm Service Agency | <ul style="list-style-type: none"> • Hazardous material routes through county • History of hazardous material incidents • High truck traffic through county on U.S. Highway 281 • Pipeline located in county • Agricultural community and high fertilizer/chemical use |
| Homeland Security Incidents | <ul style="list-style-type: none"> • Barnes County Emergency Manager | <ul style="list-style-type: none"> • Possibility for incidents at any given time |
| Severe Summer Weather | <ul style="list-style-type: none"> • National Climatic Data Center • National Weather Service • Barnes County Emergency Manager • The Spatial Hazard Events and Losses Database for the United States (SHELDUS) | <ul style="list-style-type: none"> • Presidential Disaster Declarations history • History of extensive damage from summer storms • Barnes County severe summer weather history |
| Severe Winter Weather | <ul style="list-style-type: none"> • National Climatic Data Center • National weather Service • Barnes County Emergency Manager • The Spatial Hazard Events and Losses Database for the United States (SHELDUS) | <ul style="list-style-type: none"> • Winter storm history in county • Presidential Disaster Declaration for severe winter weather • Barnes County severe winter weather history |
| Shortage or Outage of Critical Materials or Infrastructure | <ul style="list-style-type: none"> • Barnes County Emergency Manager • N.D. Public Service Commission • Stakeholder input Montana-Dakota Utilities, Dakota Valley Electric Cooperative, Dickey Rural Networks, Missouri River Energy Services, Otter Tail Power Company, Valley City Public Works, Western Area Power Administration • Individual Fuel Providers | <ul style="list-style-type: none"> • History of power outages • Shortage of critical materials history • Communication outages • History of natural gas outages • History of fuel outages |

Table 3.12 – Barnes County Major Hazards - Continued

| Hazard Profile | How Identified | Why Identified |
|--|---|--|
| Transportation Accident | <ul style="list-style-type: none"> • N.D. Dept. of Transportation • Barnes County Sheriff's Office • Barnes County Emergency Manager • N.D. Dept. of Transportation | <ul style="list-style-type: none"> • Accident history in county |
| Urban Fire/Structure Collapse Wildland Fire | <ul style="list-style-type: none"> • N.D. State Fire Marshal's Office • County Fire Districts and Departments | <ul style="list-style-type: none"> • National Fire Reporting Incident Report (NFIRS) • County fire history |
| Windstorm | <ul style="list-style-type: none"> • National Climatic Data Center • National Weather Service • Barnes County Emergency Manager • The Spatial Hazard Events and Losses Database for the United States (SHELDUS) | <ul style="list-style-type: none"> • Presidential Disaster Declarations history • History of extensive damage from summer storms • Barnes County summer storm history |

Hazards eliminated from the plan update are shown in Table 3.13 and the reason for its exclusion in the planning process.

Table 3.13 – Hazards Excluded from Plan

| Hazard | Why Excluded |
|-----------------------|--|
| Avalanche | <ul style="list-style-type: none"> • Barnes County does not have a history of avalanche disaster • There is no area in county at a severe enough grade to produce an avalanche • No past incident reports |
| Coastal Erosion | <ul style="list-style-type: none"> • Barnes County does not have an ocean coastline |
| Coastal Storm | <ul style="list-style-type: none"> • Barnes County does not have an ocean coastline |
| Expansive Soils | <ul style="list-style-type: none"> • No incident report • No historical data |
| Geological Earthquake | <ul style="list-style-type: none"> • No historical data • No incident reports • No past emergency declarations |
| Hurricane | <ul style="list-style-type: none"> • Barnes County does not have an ocean coastline |
| Levee Failure | <ul style="list-style-type: none"> • No historical data • No incident reports • No past emergency declarations |
| Tsunami | <ul style="list-style-type: none"> • Barnes County does not have an ocean coastline |
| Volcano | <ul style="list-style-type: none"> • Barnes County does not have a history of volcanic disaster • No past incident reports • No past disaster declarations |

4. County and Jurisdictions Profile and Inventory

Barnes County and Jurisdictions Overview

Barnes County is located in east-central North Dakota and is the 15th largest county in land area of the 53 counties in the state, encompassing 1,513 square miles. Of the 1,513 square miles, approximately 1,470 square miles of it is land areas (97.16 percent) and 43 square miles (2.84 percent) is water surface area. The county is approximately forty-two (42) miles from north to south and approximately thirty-five (35) miles from east to west. The 2010 population of the county is 11,066 people and has a population density of 7.6 people per square mile. Figure 9.1 in Chapter 9 is a general map of the county showing jurisdiction locations, transportation routes, airports and bodies of water.

The county is bordered on the north by Griggs County, on the northeast by Steele County, on the east by Cass County, on the west by Stutsman County, on the southwest by LaMoure County, and on the southeast by Ransom County. Interstate 94, a major trade route extending from the Seattle, Washington to Detroit, Michigan, traverses east and west through the county. Other major highways in the county include N.D. Highway 1, N.D. Highway 9, N.D. Highway 26, N.D. Highway 32 and N.D. Highway 46. There are forty-two (42) townships in the county. All are organized townships. They are from northwest to southeast: Pierce, Lake Town, Dazey, Sibley, Baldwin, Ellsbury, Uxbridge, Edna, Rogers, Ashtabula, Prairie, Minnie Lake, Brimer, Anderson, Stewart, Getchell, Noltimier, Weimer, Eckelson, Potter, Hobart, Valley, Alta, Oriska, Mansfield, Hemen, Green, Marsh, Cuba, Springvale, Meadow Lake, Svea, Skandia, Nelson, Norma, Binghampton, Greenland, Rosebud, Spring Creek, Oak Hill, Thordenskjold and Raritan. Figure 9.2 in Chapter 9 shows the geographic location of the townships in the county.

Figure 4.1 – Location of Barnes County in the State of North Dakota



Barnes County is the county outlined in red located in east-central North Dakota between Bismarck, the capital, and Fargo, the state's largest city.

The incorporated jurisdictions in the county included in this plan are Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City and Wimbledon. Figures 9.23 to 9.35 in Chapter 9 show aerials of each incorporated jurisdiction in the county. Unincorporated

communities in the county include: Berea, Cuba, Daily, Eastedge, Eckelson, Hastings, Koldok, Lucca, North Valley City, Peak, and Urbana.

Barnes County features numerous waterfowl production areas (WPAs) and national wildlife refuges. The District conserves wetland and grassland habitat for waterfowl and other wildlife species. The United States Fish and Wildlife Service manages wildlife refuges, which are public lands and waters set aside to conserve fish, wildlife and plants. The WPAs are scattered throughout the county while the wildlife refuges are located in the central portion of the county. Figure 9.3 in Chapter 9 shows a map of the WPAs and wildlife refuges in Barnes County.

Climate

Barnes County has a sub-humid continental climate characterized by marked fluctuations in daily and seasonal maximum and minimum temperatures, and light to moderate precipitation. The precipitation tends to be irregular in occurrence, amount, and area of coverage. The inconsistency of the county's weather arises from the interaction of three major air masses, which originate in distinct global regions: cold, dry air from the polar region; warm, moist air from the Gulf of Mexico; and cool, moist air from the northern Pacific. Both the temperature and the moisture characteristics of a northern Pacific air mass change as the air moves across the Rocky Mountains. The resulting air, which is usually mild and dry, reinforces the continental nature of the county's climate. The polar air mass tends to dominate the other two, but its influence is considerably lessened during the summer.

The average high temperature in January is 17 degrees F. The average low is -4 degrees F. The coldest averages at lower valley locations. In winter, temperatures often vary significantly from the averages. Temperatures around -47 F have been recorded while typical extreme winter minimum temperatures are between 9 and 19 F. The coldest temperatures occur at open valley locations when winds are light, but extreme wind chill situations occur nearly every winter when windy conditions coincide with very low temperatures. Rapid warm-ups during the winter and early spring can lead to significant snow melt and flooding of small streams and rivers, and/or ice jam flood problems.

The average high temperature in July is 82 degrees F. The average low is 57 degrees F. Averages are fairly uniform across the county. Brief spells with temperatures above 100 F can occur, but are often short in duration. Temperatures above 118 F have been reported on rare occasion. Extended periods with temperatures above 90 F occur every few years. Freezing temperatures can occur, but are rare in June and August.

Annual average precipitation is 10 to 28 inches with over 70% of the precipitation falling from May through September. Precipitation can vary from year to year and location to location within a given year. The extreme southeast portion of the county can have precipitation averages over 19 inches. November through March, are on average dry with average monthly precipitation of 0.62" or less. Average annual precipitation does not vary significantly across the county. The heaviest precipitation often occurs with localized downpours associated with thunderstorms in June through August. Significant flash flooding can result from these downpours with over 3 inches of precipitation reported in a few events. Widespread heavy precipitation events of 1 to 2 inches can occur every few years and are most common from April through June and September through early November.

Average winter snowfall ranges from 18 to 64 inches with the highest averages over the higher elevations over the southeastern part of the county. The heaviest snowstorms often occur from late March through May, or mid-October to mid-November. These storms can produce more than 12 inches of snow and are often made more severe as temperatures are warmer, and, therefore, snow is heavier and difficultly in travel and snow removal arises. These storms are often accompanied by high winds resulting in blizzard conditions. In spring these storms can coincide with the calving season resulting in livestock loss. Mid-winter snowstorms produce less than 6 inches of snow, but heavier amounts of 10 inches or more have occurred. Even without falling snow, in the colder conditions of mid-winter, high winds can pick up loose snow, resulting in local ground blizzards.

Severe thunderstorms are common from June into early September. Typically, the greatest impacts associated with these thunderstorms are very high winds and large hail. Damage to structures and crops occur every summer from these storms. Tornadoes have been reported, but are relatively rare.

An important element of the climate in Barnes County is windy conditions. Average wind speeds range from 10 to 15 mph, depending on the exposure of the location. The average and peak sustained winds tend to be stronger over higher and more exposed terrain. The highest wind gusts often occur with thunderstorms during the summer with gusts over 60 mph occurring every year. The highest sustained winds tend to occur in the spring and fall with sustained winds over 40 mph occurring every year. The county has twice reached straight line wind speeds in excess of 110 mph within the last 15 years.

Table 4.1 shows the average snowfall and depth, precipitation, and temperatures at an observation point three miles north-northwest of Valley City in Barnes County. The averages for snowfall, snow depth and precipitation are in inches and the average maximum and minimum temperatures are in Fahrenheit.

Table 4.1 – 7/1/1948 to 6/30/2007 Barnes County Snowfall, Snow Depth, Temperature, and Precipitation Averages

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| Average Max. Temperature (F) | 16.9 | 23.8 | 35.5 | 53.9 | 68.2 | 76.6 | 82.2 | 81.3 | 70.7 | 57.8 | 37.6 | 23.3 | 52.3 |
| Average Min. Temperature (F) | -3.9 | 2.1 | 14.6 | 29.1 | 41.5 | 51.7 | 56.5 | 53.5 | 43.1 | 31.7 | 17.5 | 3.7 | 28.4 |
| Average Total Precipitation (in.) | 0.53 | 0.43 | 0.78 | 1.38 | 2.66 | 3.47 | 2.93 | 2.47 | 1.99 | 1.38 | 0.68 | 0.50 | 19.20 |
| Average Total Snowfall (in.) | 7.8 | 4.8 | 5.9 | 2.8 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 4.9 | 6.1 | 33.1 |
| Average Snow Depth (in.) | 6 | 7 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 2 |

Source: High Plains Regional Climate Center

Population

Population statistics for Barnes County for the years 1980, 1990, 2000, and 2010 were obtained through the U.S. Census Bureau-Decennial Census. Population projections for 2015 and 2020 were provided by

the Housing Needs Assessment for The North Dakota Planning Region VI. Table 4.2 summarizes the population statistics for Barnes County. Statistics on population trends and projections are needed to understand the distribution of people across the county. These statistics also highlight where potential future needs will be for emergency services based on population distribution growth and density.

The population of Barnes County has been declining for the past several decades despite efforts to create new businesses and new jobs. The decline in population is primarily due to mechanization of the agriculture sector and decreases in family size. Between 1990 and 2000, the county lost 6.1 percent of its population and an additional 6.0 percent between 2000 and 2010. However, the county is estimated to grow in future decades, increasing to 11,279 people between 2010 and 2015, adding roughly 216 people, which is an increase of 1.9 percent. By 2030, the population of Barnes County is projected to grow to 12,093 people, adding roughly 1,027 people, an increase of 9.3 percent from 2010.

Table 4.2 – 1980 to 2030 Barnes County Population Statistics

| | 1980 | 1990 | 2000 | 2010 | Percent Change 1990 to 2000 | Percent Change 2000 to 2010 | Projections | | |
|----------------------|--------|--------|--------|--------|-----------------------------|-----------------------------|-------------|--------|--------|
| | | | | | | | 2015 | 2020 | 2030 |
| Barnes County | 13,960 | 12,545 | 11,775 | 11,066 | -6.1 percent | -6.0 percent | 11,279 | 11,642 | 12,093 |
| Dazey | 143 | 129 | 91 | 104 | -29.5 percent | +14.3 percent | -- | -- | -- |
| Fingal | 151 | 138 | 133 | 97 | -3.6 percent | -27.1 percent | -- | -- | -- |
| Kathryn | 95 | 72 | 63 | 52 | -12.5 percent | -17.5 percent | -- | -- | -- |
| Leal | 45 | 35 | 36 | 20 | +2.9 percent | -44.4 percent | -- | -- | -- |
| Litchville | 251 | 205 | 191 | 172 | -6.8 percent | -9.9 percent | 180 | 185 | 200 |
| Nome | 67 | 67 | 70 | 62 | +4.5 percent | -11.4 percent | -- | -- | -- |
| Oriska | 125 | 103 | 128 | 118 | +24.3 percent | -7.8 percent | -- | -- | -- |
| Pillsbury | 46 | 31 | 24 | 12 | -22.6 percent | -50.0 percent | -- | -- | -- |
| Rogers | 68 | 69 | 61 | 46 | -11.6 percent | -24.6 percent | -- | -- | -- |
| Sanborn | 237 | 164 | 194 | 192 | +18.3 percent | -1.0 percent | 200 | 205 | 220 |
| Sibley | 21 | 41 | 46 | 30 | +12.2 percent | -34.8 percent | -- | -- | -- |
| Valley City | 7,774 | 7,163 | 6,826 | 6,585 | -4.7 percent | -3.5 percent | 6,675 | 3,950 | 7,200 |
| Wimbledon | 330 | 275 | 237 | 216 | -13.8 percent | -8.9 percent | 218 | 220 | 225 |

Sources: U.S. Census: American Fact Finder, Housing Needs Assessment for The North Dakota Planning Region VI

With the continuation of energy development in the western portion of North Dakota, jobs and support services for this industry spread across the date. As a result, significant population and job number increases are likely to occur in Barnes County over the next five years.

Poverty Statistics

Statistics on poverty in Barnes County and Valley City are provided by the 2012 American Community Survey, 5-Year Estimate from the U.S. Census Bureau. Information shown includes: Number and percent of individuals with incomes below and above the poverty level. The 5-year estimate shows data that was collected by sampling households in Barnes County and Valley City between 2008 and 2012. Poverty statistics are important to understand where populations in poverty are living, which tend to be more vulnerable to natural and man-made hazards. Table 4.3 summarizes poverty statistics in Barnes County and Valley City.

According to the 2012 American Community Survey, 5-Year Estimate, there are 1,115 individuals in Barnes County with incomes below the poverty level, representing 10.6 percent of individuals in Barnes County. Conversely, there are 9,394 individuals with incomes above the poverty level, representing 89.4 percent of people in Barnes County. There are 789 individuals in the city of Valley City with incomes below the poverty level, representing 13.0 percent of individuals in the city. Conversely, there are 5,258 individuals with incomes above the poverty level, representing 87.0 percent of people in the city. Individuals living below the poverty level in Valley City represent 70.8 percent of the total in Barnes County.

Table 4.3 – 2012 American Community Survey - 5-Year Estimate Poverty Statistics

| Jurisdiction | TOTAL | Income Below Poverty Level | Income Above Poverty Level | Percent Below Poverty Level | Percent Above Poverty Level |
|---------------|--------|----------------------------|----------------------------|-----------------------------|-----------------------------|
| Barnes County | 10,509 | 1,115 | 9,394 | 10.6 percent | 89.4 percent |
| Valley City | 6,047 | 789 | 5,258 | 13.0 percent | 87.0 percent |

Source: 2008-2012 American Community Survey 5-Year Estimates

Major Recreation Areas

Lake Ashtabula. Lake Ashtabula is located 12 miles northwest of Valley City, N.D. offering a wide range of recreation opportunities. The lake offers activities for every season of the year. Fishing and snowmobiling are available in the winter. The spring and fall attract migrating waterfowl. Activities available in the summer include fishing, boating, camping, swimming, and picnicking.

Clausen Springs Dam Recreation Area. The Clausen Springs Dam Recreation Area is located 17 miles south of I-94 near the city of Kathryn. The lake is managed by the North Dakota Game and Fish Department in cooperation with the Barnes County Park Board. There is a boat dock, swimming beach, three vault toilets, and a new shower house. The park is managed by the Barnes County Park Board. It provides numerous camping sites with or without electricity and plenty of day use opportunities.

Little Yellowstone Park. Little Yellowstone Park is managed by the Barnes County Park Board. It is a 27-acre campground and multi-use recreation area located 4 miles south and 1 mile east of Kathryn on State Highway 46. It provides 34 campsites – 14 electrical and 20 more secluded primitive (non-electrical) campsites.

Sheyenne River Valley National Scenic Byway. The Sheyenne River Valley National Scenic Byway runs through Barnes County. The first nationally designated byway in North Dakota interprets the theme: "Hidden Treasure of the Great Plains the Sheyenne River and the interaction of the people with the land over time." In a state known for its flat, endless horizon, a person can take a swim in the river along a nationally designated scenic byway. The human relationship with the river and land is explored in more than 30 interpretive panels from Griggs County, north of Barnes County, to Lisbon, south of the county. The Sheyenne River Valley is a major fishing and hunting area for the county. Figure 9.4 in Chapter 9 illustrates the extent of the Sheyenne River Valley National Scenic Byway and snowmobile trails in Barnes County.

Historical Setting

When planning mitigation measures it must be established that historic archeological sites will not be negatively impacted. According to the N.D. State Historical Society, Barnes County has 823 historic/archeological sites, 64 prehistoric archeological sites, 14 historic archeological sites, 523 architectural standing structures and 222 prehistoric/historic sites not yet confirmed.

Profile of Barnes County Jurisdictions

Tables 4.4 to 4.8 profile the services, housing units, jurisdictional buildings, emergency response services, and utilities of Barnes County and incorporated jurisdictions. An “X” indicates if the jurisdiction offers the utility or service (either through contract or employees) or possesses the building or resource. Narratives following each table further detail the profile of Barnes County. Narratives for incorporated jurisdictions are shown in Chapter 8, Jurisdictions. Information on the profile of each jurisdiction was gathered at jurisdictional meetings during the planning process.

Table 4.4 shows the services provided in the county and city jurisdictions.

Table 4.4 – Services Provided in Barnes County Jurisdictions

| Services | Barnes County | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbledon |
|---|---------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Garbage Collection: Waste Management | X | | | | | | | X | | | | | | |
| Garbage Collection: Sanitation Specialists | X | X | | | | X | | | | | X | | | |
| Garbage Collection: Fraedrich Transport | X | | X | X | | | X | | | | | | | |
| Garbage Collection: City Sanitation | X | | | | | | | | | | | | X | |
| Garbage Collection: Dakota Sanitation | X | | | | X | | | | | X | | | | |
| Garbage Collection: Brager Disposal Service, Inc. | X | | | | | | | | X | | | X | | |
| Garbage Collection: Central Dakota Sanitation | X | | | | | | | | | | | | | X |
| Inert Landfill | | | | | | | X | X | | | X | X | X | |
| Lagoon | | X | X | X | | X | X | X | | | X | X | X | X |
| Lift Station | | X | X | X | | X | X | X | | | X | X | X | X |
| Recycling: Valley Recycling | | | | | | | | | | | | | X | |
| Septic Systems | X | | | | X | | | | X | X | | | | |
| Sanitary Sewer System | | X | X | X | | X | X | X | | | X | X | X | X |
| Storm Water System | | | | | | | | | | | | | X | X |
| Water: Barnes Rural Water District | X | X | X | | X | X | X | X | | X | X | | | X |

Table 4.4 – Barnes County Jurisdictional Buildings - Continued

| Jurisdictional Buildings | Barnes County | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbleton |
|------------------------------------|---------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Water: Dakota Rural Water District | X | | | | | | | | X | | | X | | |
| Water: City Service | | X | | X | | | | | | | | | X | |
| Water: City Well | | X | | X | | | | | | | | | | |
| Water: Individual Wells | X | | | | | | | | | | | | | |
| Water: Reservoir | | | | X | | | | | | | | | | |

Barnes County. Residents of Barnes County receive water from Dakota Rural Water District, Barnes Rural Water District and maintain individual wells. The county does not have a sanitary sewer or storm water system, or a lagoon and lift stations. There is not a landfill in the county, yet various rural areas are served by garbage-sanitation collection. The official newspaper of the county is the Valley City Times-Record.

Structures

Housing units show where populations are located. Table 4.5 shows the number of single-family, multifamily and mobile home structures in the city.

Table 4.5 – Housing Units in Barnes County

| Housing Units | County - outside incorporated cities | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbleton | TOTAL |
|---------------------|--------------------------------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|-------|
| Single-Family Homes | 1,643 | 45 | 47 | 37 | 14 | 84 | 31 | 41 | 17 | 29 | 84 | 24 | 1,924 | 94 | 4,114 |
| Mobile Homes | 122 | 0 | 3 | 2 | 0 | 3 | 2 | 9 | 2 | 2 | 9 | 8 | 96 | 21 | 279 |
| Multifamily Homes | 8 | 8 | 13 | 0 | 0 | 13 | 0 | 12 | 0 | 0 | 0 | 12 | 1,247 | 0 | 1,313 |

Source: 2008-2012 American Community Survey 5-Year Estimates

Table 4.6 shows the public-owned buildings in each jurisdiction by type.

Table 4.6 – Barnes County Publicly Owned Jurisdictional Buildings

| Jurisdictional Buildings | Barnes County | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbleton |
|---------------------------------------|---------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Airport | X* | | | | | | | | | | | | X* | |
| American Red Cross Shelter | X* | X | X | | | X | | X | | | | | X* | |
| Armory | | | | | | | | | | | | | X | |
| Barnes County Correctional Facility | | | | | | | | | | | | | | |
| Barnes County Courthouse | X* | | | | | | | | | | | | X* | |
| Barnes County Highway Dept. | X* | | | | | | | | | | | | X* | |
| Barnes County Rural Water Dist. | X* | | | | | | | | | | | | X* | |
| Barnes County Shop | X* | X | | X | | X | | | | | | | X* | |
| Barnes County Water Resource District | X* | | | | | | | | | | | | X* | |
| City Hall | | | | | | X | X | | | | | | X | X |
| City Shop | | | X | | | | | | | | | | X | X |
| Community Center | | X | X | X | | X | | X | | | | | X | X |
| County Public Health | X* | | | | | | | | | | | | X* | |
| Golf Course | | | | | | | | | | | | | X | |
| Library | X* | | | | | | | X | | | | | X* | X |
| N.D. Dept. of Transportation | X* | | | | | | | | | | | | X* | |
| Park | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Public Health Department | X* | | | | | | | | | | | | X* | |
| School | X | | | | | X | | X | | | | | X | |
| Shelter | | X | X | X | X | X | | X | | X | X | X | X | |
| Swimming pool | | | | | | | | | | | | | X | |
| U.S. Army Corps of Engineers | X | | | | | | | | | | | | | |
| U.S.D.A. Farm Service Agency | X* | | | | | | | | | | | | X* | |
| U.S. National Guard | X* | | | | | | | | | | | | X* | |
| U.S. Post Office | | X | X | X | | X | X | X | | X | | | X | X |
| University | X* | | | | | | | | | | | | X* | |

X* denotes that the county-owned building is both listed under county and the city of Valley City, the county seat.

Barnes County. The Barnes County Courthouse, Barnes County Correctional Facility, City-County Health District, highway department, and library are also located in Valley City. The county maintains shops in the cities of Dazey, Kathryn, Litchville and Valley City. Barnes County has a municipal airport located in Valley City. The county maintains a park at Clausen Springs Dam near Kathryn. The county maintains Bjornson Public Golf Course in Valley City. The N.D. Department of Transportation maintains an office in the county located in Valley City. Barnes County North is a public school located between the cities of Wimbleton and Leal. The U.S. National Guard has a facility in the county located in Valley City. The Barnes County Rural Water District and Barnes County Water Resource District have offices located in Valley City. Valley City State University is the only institute of higher education in the county

and is located in Valley City. The U.S. Department of Agriculture, Farm Services Agency and the U.S. Army Corps of Engineers has offices in Barnes County located in Valley City. The county has shelters located at Dazey Community Center, Barnes County North School, Sanborn Community Center, Oriska Elementary School, Litchville Elementary School, Holy Trinity Church in Fingal, and 10 in Valley City. Figures 9.6 and 9.6 show the locations in Barnes County and Valley City. The county does not have a county-specific community center, armory, or swimming pool. There are 4,114 single-family homes, 1,313 multifamily units and 279 mobile homes in Barnes County as of the 2012 American Community Survey. Outside of incorporated jurisdictions, there are 1,643 single-family homes, eight multifamily units and 122 mobile homes.

Table 4.7 shows the emergency response services and facilities in each jurisdiction. Due to the small size of some jurisdictions, services are provided by outside entities or jurisdictions. These jurisdictions are marked by an asterisk (*).

Table 4.7 – Barnes County Jurisdictional Emergency Response Services and Facilities

| Emergency Response Services/Facilities | Barnes County | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbleton |
|--|---------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Ambulance | X | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Ambulance Hall | X | | | | | | | | | | | | X | |
| County Sheriff | X | | | | | | | | | | | | X | |
| Fire Department | | X | X | X | * | X | X | X | * | X | X | X | X | X |
| Fire District | | X | X | X | * | X | X | X | * | X | X | | X | X |
| Fire Hall | | X | X | X | X | X | X | X | | X | X | X | X | X |
| First Responders | | X | X | X | * | X | * | | * | | X | | X | X |
| Law Enforcement | | * | * | * | * | * | * | * | * | * | * | * | X | * |
| Law Enforcement Building | X | | | | | | | | | | | | X | |

*Denotes jurisdictions with emergency response services located in another jurisdiction.

Barnes County. Barnes County has a sheriff’s department with its own headquarters in Valley City. The sheriff’s department provides law enforcement services to all jurisdictions in the county. The Valley City Police Department has been deputized by the sheriff’s department. A private company operates Barnes County Ambulance and maintains its own facility. The county does not maintain a county fire department or fire district as fire protection is provided by individual entities. The fire departments and districts also provide first response. The unincorporated jurisdiction of Hastings has a rural fire department.

Table 4.8 shows the utility providers for jurisdictions in Barnes County. Some providers for utilities, such as fuel oil and propane are unknown as residents choose providers on an individual basis.

Table 4.8 – Utility Providers Serving Barnes County

| Utility Providers | Barnes County | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbledon |
|--|---------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Barnes Rural Water District | X | X | X | * | X | X | X | X | | X | X | | | X |
| Bek Communications | X | | | | | | | X | | | | | X | |
| Cable Service, Inc. (CSI) | X | | | | | | | | | | | | X | |
| Dakota Central (Daktel) | X | | | | | | | | | | | | | X |
| Dakota Rural Water District | X | | | | | | | | X | | | X | | |
| Dickey Rural Networks (DRN) | X | | | X | | X | | | | | | | | |
| Direct Broadcast Satellite Service | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Fuel Oil | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Individual Wells | X | X | | X | | | | | | | | | | |
| Inter-Community Telephone Company (ICTC) | X | X | X | | X | | X | | X | X | X | X | | |
| Mid-Continent | X | | | | | | | | | | | | | X |
| Missouri River Energy Services (MRES) | X | | | | | | | | | | | | X | |
| Montana-Dakota Utilities (MDU) | X | | | | | | | X | | | X | | X | |
| Otter Tail Power Company | X | X | X | X | X | X | X | X | X | X | X | X | | X |
| Propane | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Qwest | X | | | | | | | X | | | | | X | |
| Valley City Public Works | X | | | | | | | | | | | | X | |
| Western Area Power Administration (WAPA) | X | | | | | | | | | | | | X | |

*Denotes jurisdiction with utility provided by the marked entity scheduled for implementation in the future.

Barnes County. Potable water is provided by Barnes Rural Water District, Dakota Rural Water District and individual wells. Electricity in Barnes County is provided by Otter Tail Power. Natural gas is provided Montana-Dakota Utilities (MDU), Missouri River Energy Services (MRES) and Western Area Power Administration (WAPA). Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. BEK Communications, Cable Service, Inc. (CSI), Dakota Central (Daktel), Dickey Rural Networks (DRN), Inter-Community Telephone Company (ICTC), Mid-Continent, Qwest and direct broadcast satellite service providers provide phone, internet and cable. Barnes County has jurisdictional buildings located in the city of Valley City and therefore use services provided by Valley City Public Works.

County and City-Owned Buildings and Property

Information on county-owned buildings and the insurance limit valuation for the year 2013 was provided by the Barnes County Auditor's Office and is summarized in Table 4.9. Information on county and city-owned buildings is important in mitigation to understand the potential losses and what public assets are at risk to hazards. The insurance limit valuation includes the building and all contents contained therein. The structure in Wimbledon also includes outdoor property.

Of the incorporated cities in Barnes County, the city of Valley City contains the most county-owned buildings with 19 valued at \$19,461,931. The city of Kathryn has two buildings while the cities of Dazey and Wimbledon, and unincorporated Eckelson has one building each.

Table 4.9 – 2013 County-Owned Buildings and Insurance Limit Valuation

| Barnes County | | |
|---------------|----------------------|---|
| City | Number of Properties | Insurance Limit Valuation (total, all properties) |
| Dazey | 1 | \$68,148 |
| Eckelson | 1 | \$61,631 |
| Kathryn | 2 | \$72,188 |
| Valley City | 19 | \$19,461,931 |
| Wimbledon | 1 | \$452,825 |
| Total | 24 | \$20,116,723 |

Source: Barnes County Auditor's Office; North Dakota Insurance Department

The following critical facilities and infrastructure shown in Table 4.10 are owned by local governments in Barnes County, according to the 2014 NDMHMP. A majority of facilities and infrastructure owned by county governments, cities and townships are insured through the North Dakota Fire and Tornado Fund. Data shown is a near complete assessment of the replacement value for local government facilities if impacted by hazards. As listed in the 2014 NDMHMP, these facilities and infrastructure include the following: county courthouses, city halls, community centers, pump houses, ambulance buildings, road shops, lift stations, jails, park facilities, water and wastewater treatment plants, fire stations, museums, warning sirens, municipal airport facilities and storage buildings. However, a description of how these facilities were classified – whether they are buildings or outdoor properties – was not included.

Table 4.10 – 2013 Critical Facilities and Infrastructure Owned by Local Governments

| County | # of Building Properties | Building Property Value | # of Personal Property Policies | Personal Property Value |
|-------------------------|--------------------------|-------------------------|---------------------------------|-------------------------|
| Barnes | 104 | \$52,153,787 | 49 | \$6,742,328 |
| | | | | |
| # of Outdoor Properties | Outdoor Property Value | # of Trailer Properties | Trailer Property Value | Total Value |
| 41 | \$6,084,950 | 0 | \$0 | \$64,981,065 |

Source: 2014 North Dakota Multi-Hazard Mitigation Plan

A total of 104 building properties were identified with a total value of \$52,153,787 or \$511,094 per building. The local governments also own 49 personal property policies valued at \$6,742,328, or \$137,599 per policy. There is a total of 41 outdoor properties in the county valued at \$6,084,950, or \$148,413 per property. There are no trailer properties owned by local jurisdictions in Barnes County. The total value of buildings, personal property and outdoor properties is \$64,981,065.

Comparison of data provided by the Barnes County Auditor's Office and the 2014 NDMHMP on buildings and property owned by local governments reveals that local jurisdictions aside from the county own approximately 170 buildings and personal properties valued at approximately \$44,864,342, or roughly \$263,910 per building, including personal property.

Transportation System

The county is highly dependent upon its network of federal, state, county roads, and highways. Interstate 94 and N.D. State Highways 9, 26, and 46 are the major east-west bound routes across the county. N.D. State Highways 1 and 32 are major north-south bound routes. Figure 9.7 in Chapter 9 shows the highway system in Barnes County. Figure 9.19 shows the township grade raises that have been completed utilizing hazard mitigation funds and future road mitigation sites in the county in Chapter 9. Figure 9.20 in Chapter 9 shows the load restrictions of the Barnes County Road System.

Evacuation Routes

Barnes County Emergency Management has designated official evacuation routes for each incorporated jurisdiction in the county. Evacuation routes are necessary in mitigation to reduce or eliminate loss of life and injury during hazards. Figures 9.8 to 9.18 in Chapter 9 show the evacuation routes in incorporated jurisdictions in the county, which are highlighted in red.

Freight Railroad Operated in Barnes County

According to the 2007 North Dakota State Rail Plan, two railroad companies operate three freight rail lines in Barnes County. The Burlington Northern Santa Fe Railway (BNSF) operates the Surrey Junction-Mandan and the Fargo-Minot line, and the Canadian Pacific Railway (CPR) operates Enderlin-Harvey line. Information on the transportation system, including freight railroad, bridges and airports, is important for understanding the transportation system and potential risk involved with transportation accidents, among other hazards. The railroads in Barnes County are classified as short-line/regional rail lines. Table 4.11 summarizes information on freight railroads operated in Barnes County. Figure 9.1 in Chapter 9 shows the extent of the freight railroad transportation system in Barnes County.

The Fargo-Minot line, operated by the BNSF carrier, runs approximately 203.2 miles from Fargo to Minot and connects to the Jamestown Subdivision mainline at the Surrey Junction, and to the Devils Lake Subdivision mainline at the Surrey station. The line has a maximum speed of 60 mph. The maximum carload is 143 tons. Data from 2004 shows that 15.9 million bushels of grain were generated on the line in 2004, generating approximately 3,906 carloads of grain. The line traverses the extreme northeast corner of Barnes County and impacts the city of Pillsbury.

Table 4.11 – 2007 Freight Railroad Operated in Barnes County

| Railroad | Rail Line | Subdivision | Length in Miles | Max Speed | Max. Carload | Tons Generated* |
|-------------------------------------|-----------------------------|------------------------|-----------------|-----------|--------------|-----------------|
| Burlington Northern Santa Fe (BNSF) | Fargo-Minot line | KO Subdivision | 203.2 | 60 mph | 143 tons | 494,447 |
| Burlington Northern Santa Fe (BNSF) | Surrey Junction-Mandan line | Jamestown Subdivision | 200.3 | 60 mph | 143 tons | 723,304 |
| Canadian Pacific Railway (CPR) | Enderlin-Harvey line | Carrington Subdivision | 139.2 | 49 mph | 143 tons | 570,831 |

* Tons generated are based on a 3-year average from 2002 to 2004.

Source: North Dakota State Rail Plan, 2007

The Surrey Junction-Mandan line, operated by the BNSF carrier, connects to the KO Subdivision at Surrey Junction and traverses 169.1 miles to the Mandan station. The line has a maximum speed of 60 mph. The maximum carload capacity is 143 tons. Data from 2004 states that 23.8 million bushels of grain were transported on the line in 2004, generating approximately 6,332 carloads. The line bisects the county from west to east and impacts the incorporated cities of Sanborn, Valley City, and Oriska. The line impacts the unincorporated cities of Berea, Eckelson, Koldok, Peak, and Urbana.

The Enderlin-Harvey line, operated by the CPR carrier, extends diagonally across the state of North Dakota. The segment traversing through Barnes County is approximately 139.2 miles in length and impacts the incorporated cities of Fingal, Leal, Rogers, Valley City, and Wimbledon. The line also impacts the unincorporated cities of Cuba, Lucca, and North Valley City. The line has a maximum speed of 49 mph. and a maximum carload capacity of 143 tons. Data from 2004 shows that 22.3 million bushels of grain were transported on the line generating 5,795 carloads.

Barnes County Bridges

There are a total of 11 structurally deficient and functionally obsolete bridges in Barnes County as shown in the 2014 NDMHMP from information provided by the North Dakota Department of Transportation. A total of seven bridges are state structures; three are structurally deficient and four are functionally obsolete. A total of three bridges are county structures; two are structurally deficient and one is functionally obsolete. There is one functionally obsolete urban bridge in the county. In addition, there are a total of two scour bridges. Both bridges are county-owned. A bridge is scour critical if the bridge foundation is determined to be unstable for the calculated scour conditions and are especially vulnerable during flooding. Figures 9.19 and 9.20 in Chapter 9 show the township grade raises that have been completed utilizing hazard mitigation funds and future road mitigation sites, and the load restrictions of the Barnes County Road System. Table 4.12 shows detailed information about these bridges as provided by the N.D. Department of Transportation – District 2, and the Barnes County Highway Department. Bridge ratings shown are current as of June, 2013.

Table 4.12 – 2014 Barnes County Structurally Deficient, Functionally Obsolete, Scour Critical Bridges

| Bridge No. | Type | General Location | Bridge Rating |
|--------------|--------------------------------|---|------------------------|
| 0001-051.506 | Single 10' x 5' x 49' RCB | North of Highway 46 | Structurally Deficient |
| 0001-055.761 | Single 9' x 8' x 45' RCB | 4 miles north of Highway 46 | Structurally Deficient |
| 0094-290.641 | Single 9' x 88' SPP | Exit 290, westbound off ramp | Functionally Obsolete |
| 0094-290.803 | Pre-Stressed Concrete Box Beam | Exist 290 Interchange, eastbound | Functionally Obsolete |
| VC01 | Concrete Arch Deck | 4 th St. SW, east side of park | Functionally Obsolete |
| 02-132-40.0 | Concrete Cast in Place | 1 mile southeast of Nome | Structurally Deficient |
| 02-117-03.0 | Concrete Channel Beam | 3 miles east and 1 mile north of Dazey | Structurally Deficient |
| 02-122-36.0 | Steel Stringers | 1 mile west and 2 miles north of Kathryn | Functionally Obsolete |
| 02-124-39.0 | Concrete Tee Beam | Southeast of Kathryn | Scour Critical |
| 02-124-39.3 | Concrete Channel Beam | 1 mile east and 1 mile north of Kathryn | Scour Critical |

Sources: 2014 NDMHMP, N.D. Dept. of Transportation – District 2, Barnes County Highway Department

According to Barnes County Highway Superintendent, both scour critical bridges are located in Oakhill Township. There are multiple bridges with scour concerns that are watched closely by the department.

Barnes County Airports

Information regarding airports in Barnes County is summarized in Table 4.13 and was obtained from the ND Aeronautics Commission (NDAC), the 2014 NDMHMP and Air NAV. The NDAC was established in 1947 by the state legislature, assigning responsibility for state aviation functions and serves the public by providing economic and technical assistance for the aviation community. Air NAV is a website that publishes aeronautical and airport information released by the Federal Aviation Administration (FAA).

There is one airport in Barnes County located north of Valley City. The data shown for aircraft operations was collected for a 12-month period from Air NAV ending July 2011.

Table 4.13 – Barnes County Airports

| Airport | Jurisdiction | Aircraft Operations July 2010 to July 2011 | | | |
|---------------------------------|---------------|--|-----------------------------------|---------------------------------------|---|
| Barnes County Municipal Airport | Barnes County | Operations avg. 21/day | 58 percent local general aviation | 38 percent transient general aviation | 3 percent air taxi, <1 percent military |

Sources: ND Aeronautics Commission, AirNAV, 2014 NDMHMP

The Barnes County Municipal Airport reported an average of 21 aircraft operations per day, consisting of 58 percent local general aviation, 38 percent transient general aviation, three percent air taxi and less than one percent military. The airport is located approximately one-mile northwest of the city’s main street and is situated at an elevation of 1,402 feet above sea level.

It should be noted that information was available for one municipal airport in Barnes County. However, many private airstrips are located throughout the county and are used for spraying of crops for agricultural purposes. The location and size of these airstrips is not available. Oral history gathered from residents of Barnes County through jurisdiction meetings revealed that nearly all air crashes occurring in the county involved planes used for spraying of crops and originated from privately-owned air strips.

Figure 9.21 in Chapter 9 is an aerial photograph of the Barnes County Municipal Airport.

Medical Facilities

Locations of medical facilities in Barnes County was collected by contacting the business office of each facility. Medical facilities are critical infrastructure in the county for emergency services and play an important role in determining the vulnerabilities of the county for mitigation. Table 4.14 summarizes these facilities.

Mercy Hospital located in Valley City is the only hospital in Barnes County and was founded in 1928. The hospital is a critical access hospital. The hospital is open 24/7 and provides 25 beds and two operating rooms. Services provided by the hospital are shown in Table 4.14. Areas of expertise provided by hospital by staff include: family medicine, general surgery, hematology/oncology, internal medicine, ophthalmology/cataract surgery, orthopedics and sports medicine, dentistry, and podiatry. An expanded list of services provided by the hospital are shown in Table 4.14.

The Sanford Health-Valley City Clinic is open 8 a.m. to 5 p.m. Monday through Friday and 9:30 a.m. to 12:00 p.m. Saturday. Mammography hours are 8:30 a.m. to 2:00 p.m. on Wednesdays. Services are shown in Table 4.14.

The Essentia Health-Valley City Clinic is open 8 a.m. to 5 p.m. Monday through Friday. Services are shown in Table 4.14.

Table 4.14 – 2014 Barnes County Medical Facilities

| Facility Name | City | Capacity | Services |
|-----------------|-------------|----------------------------------|--|
| Mercy Hospital | Valley City | 25 beds, two operating rooms | Ambulatory care, cardiac rehab, emergency services, home care, home medical equipment, imaging, inpatient, laboratory, nutritional, occupational therapy, organ & tissue donation, PADnet studies, physical therapy, respiratory therapy, sleep studies, social & behavioral, spiritual, stress testing, surgical services |
| Sanford Health | Valley City | 20 exam rooms, 2 procedure rooms | Dermatology, family medicine, geriatric medicine, hematology, internal medicine, mammography, medical oncology, nephrology, nurse navigator, orthopedic surgery, pediatrics, podiatry, radiology, sleep medicine, surgery, urology, vascular surgery |
| Essentia Health | Valley City | -- | Chiropractic, diabetes dietitian, family medicine, internal medicine, orthopedics/surgery, podiatry, sports medicine, general surgery |

Source: Essentia Health-Valley City Clinic, Mercy Hospital, Sanford Health-Valley City Clinic

Special Needs/Age Restricted Facilities

Barnes County has nine facilities housing the elderly or individuals with special needs. Information on these facilities was provided by the Housing Needs Assessment for The North Dakota Planning Region VI. The needs assessment was conducted in 2013. Information to show populations that would need assistance in evacuation during times of hazards is included; facilities catering to special population groups such as the disabled, elderly and incarcerated are often more vulnerable during disasters. Information on these facilities is summarized in Table 4.15.

Table 4.15 – 2013 Special Needs/Age Restricted Facilities in Barnes County

| Building Name | Type | City | Total Units |
|--------------------------|--|-------------|-------------|
| Rudolf Square Apartments | Subsidized/Affordable Adult/Few Services | Valley City | 47 |
| Sky Villa | Subsidized/Affordable Adult/Few Services | Valley City | 40 |
| Elks Apartments | Market Rate Adult/Few Services | Valley City | 12 |
| Landmark II Apartments | Market Rate Adult/Few Services | Valley City | 28 |
| Rainbow Apartments | Market Rate Adult/Few Services | Valley City | 13 |
| Greystone Apartments | Market Rate Adult/Few Services | Valley City | 16 |
| Landmark I Apartments | Market Rate Adult/Few Services | Valley City | 17 |
| Bridgeview Estates | Market Rate Assisted Living | Valley City | 44 |
| The Legacy Place | Market Rate Assisted Living | Valley City | 43 |

Source: Housing Needs Assessment for The North Dakota Planning Region VI

There are a total of 87 subsidized/affordable adult/few services senior housing units, 86 market rate adult/few services senior housing units and 87 market rate assisted living senior housing units for a total of 260 special needs/age-restricted housing units in Barnes County. No market rate independent/active adult rental or for-sale units, market rate congregate/optional services, memory care or skilled nursing units were identified in the county.

Primary Education

Students in Barnes County attend six schools located in the county: Barnes County North Public School located in rural Barnes County between Wimbledon and Leal, Oriska Elementary School in Oriska, Litchville-Marion Elementary School in Litchville, Jefferson Elementary School in Valley City, Valley City Junior-Senior High School in Valley City, and Washington Elementary School in Valley City. Table 4.16 summarizes enrollments of the schools.

Table 4.16 – 2009 to 2014 Enrollment of Public Schools Located in Barnes County

| Location | School | School District | Enrollment Year | | | | | |
|---------------|-----------------------------------|-----------------------|-----------------|------|------|------|------|------|
| | | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| Barnes County | Barnes County North Public School | Barnes County North 7 | 149 | 154 | 138 | 137 | 139 | 276 |
| Litchville | Litchville-Marion Elem. School | Litchville-Marion 46 | 53 | 53 | 46 | 45 | 50 | 55 |
| Oriska | Oriska Elem. School | Maple Valley 4 | 45 | 59 | 48 | 47 | 49 | 47 |
| Valley City | Jefferson Elem. School | Valley City 2 | 304 | 318 | 354 | 358 | 344 | 332 |
| Valley City | Valley City Jr.-Sr. High School | Valley City 2 | 552 | 519 | 567 | 527 | 526 | 517 |
| Valley City | Washington Elem. School | Valley City 2 | 223 | 242 | 208 | 220 | 237 | 235 |
| Valley City | St. Catherine’s Elem. School | Valley City 2 | 71 | 66 | 58 | 55 | 51 | 58 |

Source: North Dakota Department of Public Instruction

Information on the enrollment of the schools located in Barnes County was provided by the ND Office of Public Instruction. Enrollment figures for schools located in Barnes County are shown instead of school district totals to show the number of students physically attending instruction within county boundaries. Information on the number of students at education buildings in the county are needed for mitigation to identify vulnerable populations that would need assistance in evacuating during hazard events. School buildings also can serve as an unofficial shelter for residents. Transportation of students to and from schools and for activities also increases transportation risks. Figure 9.22 in Chapter 9 shows the geographic extent of each school district serving Barnes County students.

The Barnes County North 7 School District covers areas in northwest Barnes County. The school opened in fall 2013 and combined North Central-Rogers and Wimbledon-Courtenay school districts.

The Litchville-Marion 46 School District covers areas of southwest Barnes County. The district’s elementary school is located in the city of Litchville. The district’s high school is located in the city of Marion in neighboring LaMoure County.

The Maple Valley 4 School District covers areas of east-central Barnes County. The elementary school for the district is located in the city of Oriska. The high school for the district is located in the city of

Tower City in neighboring Cass County. The district also includes West Elementary School in Buffalo in neighboring Cass County and Wheatland Colony School on a hutterite colony near Tower City.

The Valley City 2 School District covers areas of central Barnes County. The district includes Jefferson Elementary School and Washington Elementary, and Valley City Junior-Senior High School in Valley City. The district also includes one private elementary school called St. Catherine’s.

School districts covering geographic areas in Barnes County where students can attend instruction, but do not have school buildings in the county, include: Montpelier School District in Stutsman County, Griggs County School District, Enderlin School District in Ransom County, and the Hope-Page School District in Steele County.

Higher and Secondary Education

There is one public university and one vocational technology school in Barnes County. Both are located in Valley City. Table 4.17 summarizes enrollments of the institutions in Barnes County. Information on the number of students living in campus housing is also shown for Valley City State University (VCSU). Information on the location of primary education buildings and then number of students living in campus dormitories are needed for mitigation to identify vulnerable populations that would need assistance in evacuating during hazard events. Buildings on campus of higher and secondary education also can serve as an unofficial shelter for residents.

Valley City State University in Valley City, Barnes County, is a four-year institution in the North Dakota University System, that offers more than 80 degree programs in teacher education, information technology, business, communication arts, social science, math, science, health, physical education, art, music, and fish and wildlife, and offers degrees in nursing in partnership with Dakota College in Bottineau. VCSU offers the only undergraduate software engineering degree in North Dakota. Online and distance education options include a Master of Education (M.Ed.), graduate and undergraduate programs in Technology Education, and an endorsement in English Language Learners (ELL)/English as a Second Language (ESL).

Table 4.17 – 2008 to 2013 Higher and Secondary Education Institution Enrollments and On-Campus Housing

| Institution | Number of Students by School Year | | | | | | |
|--|-----------------------------------|------|-------|-------|-------|-------|-------|
| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| Sheyenne Valley Area Career & Tech Center | -- | 161 | 143 | 130 | 136 | 176 | 200 |
| Valley City State University Enrollment | 900 | 961 | 1,138 | 1,227 | 1,214 | 1,211 | 1,234 |
| Valley City State University – On-Campus Student Housing Capacity (beds) | | | | | 517 | 517 | 517 |

Source: Valley City State University Registrar’s Office, Valley City State University Department of Housing, Sheyenne Valley Career & Technology Center

Enrollment numbers for VCSU show official census of total undergraduate headcount taken at the 4th week of fall semester. Graduate school students are not included as all graduate programs at VCSU are based online. The total capacity of on-campus housing beds at VCSU is shown to understand the highest number of possible students living on-campus despite occupancy rates averaging 70 percent per academic year.

Enrollment numbers for Sheyenne Valley Area Career & Tech Center show the number of student attending classes on campus and do not reflect students taking courses conducted via interactive television (ITV). The enrollment numbers shown represent totals for the fall of that academic school year (i.e. 2014-2015).

Housing Units

Information on housing units for Barnes County and city jurisdictions was provided by the U.S. Census Bureau, American Community Survey and the Housing Needs Assessment for the North Dakota Planning Region VI. Housing unit information presented includes: total housing units in 2010, and the median year built and median value of owner-occupied units in 2011. This information is important for understanding the potential impact hazards will have on property and the potential magnitude of damage. Table 4.18 summarizes this information.

As of 2010, Barnes County contained 5,704 housing units in a total area of 1,513 square miles, resulting in 3.8 housing units per square mile. The median year built for structures was 1962 and the median value of owner-occupied housing units was \$84,000. The most-dense jurisdictions in the county were, in descending order: the cities of Valley City, Wimbledon, Oriska, Dazey and Sanborn with 955.8, 225.5, 225.0, 147.4, and 145.5 housing units per square mile, respectively. Valley City had the highest median value of owner-occupied housing units at \$88,000. The city of Litchville had the lowest at \$26,300.

Data on the median year built for structures and median value of owner-occupied housing units was not available for the cities of Dazey, Fingal, Kathryn, Leal, Nome, Oriska, Pillsbury, Rogers, and Sibley. The median value of owner-occupied housing units was available for the city of Sanborn, but the median year built for structures was not.

Table 4.18 – 2010 & 2011 Barnes County Housing Units Statistics

| | Number of Housing Units 2010 | Total Area Per Square Mile | Number of Housing Units per Square Mile | Median Year Housing Unit Built 2011 | Median Value of Owner-Occupied Housing Units 2011 |
|--------------------|------------------------------|----------------------------|---|-------------------------------------|---|
| Barnes Co. | 5,704 | 1,513 | 3.8 | 1962 | \$84,000 |
| Dazey | 56 | 0.38 | 147.4 | – | – |
| Fingal | 57 | 0.42 | 135.7 | – | – |
| Kathryn | 37 | 0.59 | 62.7 | – | – |
| Leal | 11 | 0.14 | 78.6 | – | – |
| Litchville | 98 | 1.48 | 66.2 | 1947 | \$26,300 |
| Nome | 35 | 0.41 | 85.4 | – | – |
| Oriska | 63 | 0.28 | 225.0 | – | – |
| Pillsbury | 12 | 0.26 | 46.2 | – | – |
| Rogers | 28 | 0.98 | 28.6 | – | – |
| Sanborn | 80 | 0.55 | 145.5 | – | \$43,800 |
| Sibley | 50 | 0.40 | 125.0 | – | – |
| Valley City | 3,307 | 3.46 | 955.8 | 1965 | \$88,000 |
| Wimbledon | 119 | 0.53 | 225.5 | 1961 | \$48,900 |

Sources: U.S. Census: American Fact Finder, Housing Needs Assessment for The North Dakota Planning Region VI

New Development

Building permits are required for value-added and new construction projects. This includes both inside and outside work on a home or business. Building permits are not required for maintenance work such as painting, replacement of windows, floor covering, or shingles. Trends in new development are critical for mitigation to understand where potential mitigation projects are needed currently and in the future based on growth trends and the valuation in overall real estate and economic investments. Building permit data for Valley City is summarized in Table 4.19.

Future Development

There are several development projects currently under construction or planned in Barnes County. Each development project is detailed below. Due to the amount of building and development in Valley City only major construction projects are discussed.

Valley City

- First Community Credit Union constructed a new bank located at 115 5th Avenue NE. The project started in early 2013 and is complete. The project was valued at \$760,000.
- Valley Realty is constructed a 42-plex located at 855 12th Street NW. The project will feature income-restricted housing units. The project is valued at \$3,000,000.
- Enterprise Sales is constructing a new building located at 325 Wintershow Road SW. The project is valued at \$865,000.
- John Deere Seeding Group built an addition onto their facility located at 1725 7th Street SE. The project started in 2013. The addition is valued at \$9,500,000.
- A new hotel is being developed on Winter Show Road named the GrandStay Hotel and Suites. The hotel is in the preconstruction phase as of November, 2014, and no groundbreaking date has been set.
- The infrastructure for a new industrial park was recently completed adjacent to Interstate 94 in southeast Valley City east of the exiting John Deere Seeding Group facility.

Ellsbury Township

- Arthur Grain Company is constructing a fertilizer sales building in Ellsbury Township. Figure 4.3 on the following page shows the layout of the fertilizer building, legs, and conveyors.

Adjacent to Barnes County

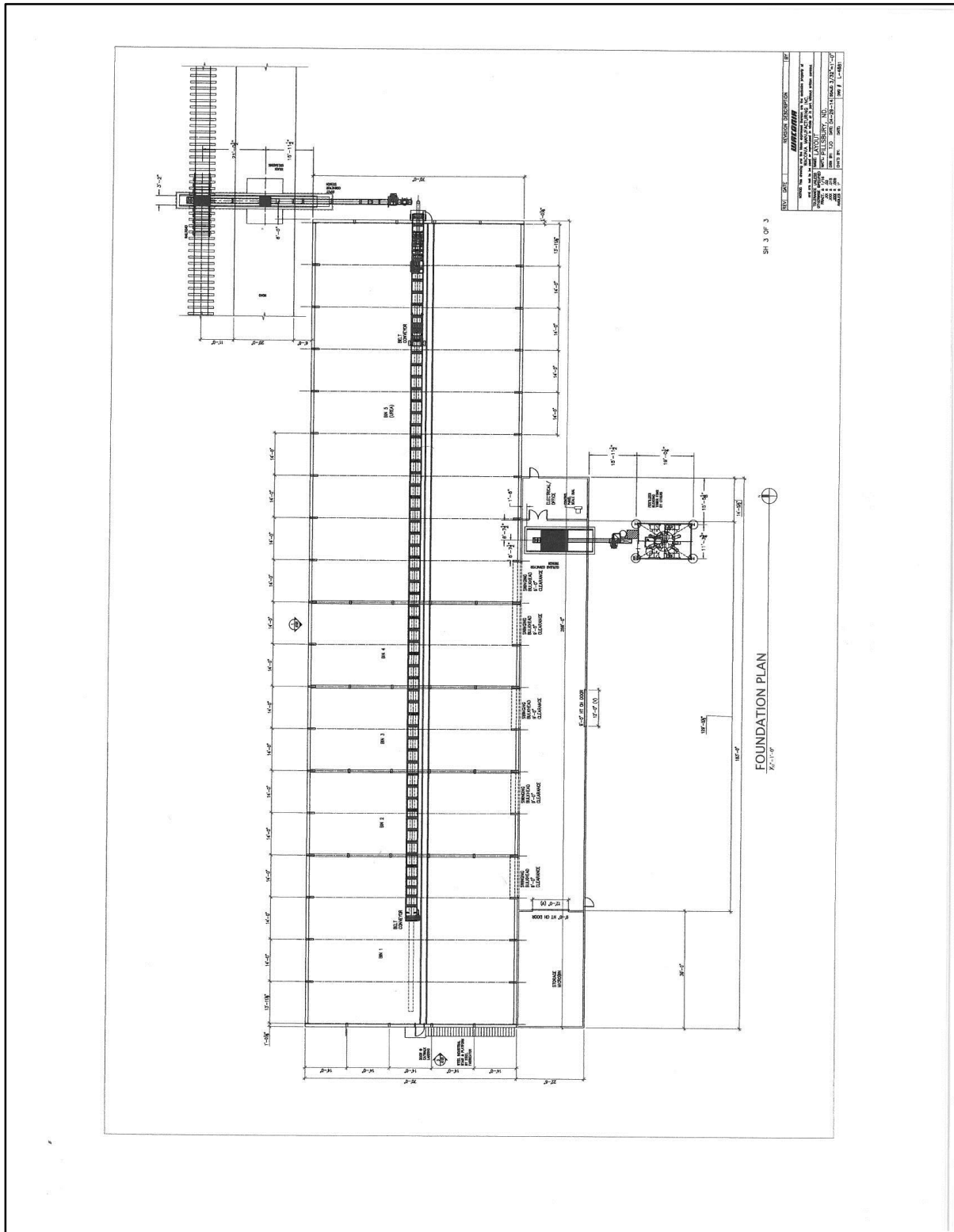
- Cenex Harvest States (CHS) announced the development of a nitrogen-fertilizer plant to be constructed in phases in Spiritwood Township in neighboring Stutsman County to the west. In addition, Dakota Spirit Ag Energy is constructing an ethanol plant and a coal-fired power plant was recently completed. Development in this industrial park will impact western portion of Barnes County and contribute to population and job growth county-wide.

Table 4.19 – 2004 to October 2014 Valley City Building Permit Data

| Historical Building Permit Report for the City of Valley City | | | | | | | | | | | |
|---|--------------|------------------------|--------------|--------------|---------------|---------------|--------------|---------------|--------------|--------------|----------------|
| Year | # of Permits | BUILDER ESTIMATED COST | | | | | | | | | ANNUAL TOTALS |
| | | Residential | | | Commercial | | | Institutional | | | |
| | | New | Additions | Updates | New | Additions | Updates | New | Additions | Updates | |
| 2004 | 115 | \$ 535,560 | \$ 262,950 | \$ 230,027 | \$ 1,377,200 | \$ 1,224,000 | \$ 114,389 | \$ 770,000 | \$ 445,000 | \$ 2,125,849 | \$ 7,084,975 |
| 2005 | 100 | \$ 2,217,500 | \$ 548,000 | \$ 242,300 | \$ 6,164,550 | \$ 1,419,500 | \$ 683,000 | \$ 5,500 | \$ - | \$ 82,000 | \$ 11,362,350 |
| 2006 | 72 | \$ 3,814,400 | \$ 397,400 | \$ 112,000 | \$ 2,962,100 | \$ 1,860,000 | \$ 627,500 | \$ 900,000 | \$ - | \$ - | \$ 10,673,400 |
| 2007 | 88 | \$ 1,477,400 | \$ 397,200 | \$ 162,700 | \$ 1,818,000 | \$ 1,210,000 | \$ 459,500 | \$ 415,000 | \$ - | \$ 39,000 | \$ 5,978,800 |
| 2008 | 83 | \$ 2,524,400 | \$ 396,500 | \$ 386,021 | \$ 2,145,209 | \$ 216,359 | \$ 75,000 | \$ 5,175,000 | \$ - | \$ 706,000 | \$ 11,624,489 |
| 2009 | 146 | \$ 1,654,210 | \$ 251,900 | \$ 231,610 | \$ 550,000 | \$ 796,500 | \$ 543,790 | \$ 600,000 | \$ 1,556,854 | \$ - | \$ 6,184,864 |
| 2010 | 113 | \$ 1,070,980 | \$ 159,300 | \$ 161,150 | \$ 1,307,000 | \$ 361,300 | \$ 189,500 | \$ 145,260 | \$ 950,000 | \$ 3,262,030 | \$ 7,606,520 |
| 2011 | 73 | \$ 700,180 | \$ 272,600 | \$ 108,610 | \$ 1,328,415 | \$ 600,000 | \$ 202,000 | \$ 21,082,290 | \$ - | \$ 118,900 | \$ 24,412,995 |
| 2012 | 106 | \$ 2,939,528 | \$ 200,000 | \$ 134,630 | \$ 1,626,500 | \$ 249,200 | \$ 1,153,300 | \$ 239,000 | \$ - | \$ 269,570 | \$ 6,811,728 |
| 2013 | 5 | \$ 2,561,150 | \$ 229,000 | \$ 127,920 | \$ 1,577,000 | \$ 11,230,000 | \$ 315,000 | \$ 6,000 | \$ - | \$ 15,000 | \$ 16,061,070 |
| 2014 | 118 | \$ 3,405,516 | \$ 126,555 | \$ 223,773 | \$ 6,591,454 | \$ 150,000 | \$ 660,000 | \$ 1,138,110 | \$ 384,500 | \$ 255,000 | \$ 12,934,908 |
| 2015 | | | | | | | | | | | \$ - |
| 2016 | | | | | | | | | | | \$ - |
| 2017 | | | | | | | | | | | \$ - |
| Total from 2004 to October 2014 | 1,019 | \$ 22,900,824 | \$ 3,241,405 | \$ 2,120,741 | \$ 27,447,428 | \$ 19,316,859 | \$ 5,022,979 | \$ 30,476,160 | \$ 3,336,354 | \$ 6,873,349 | \$ 120,736,099 |

Source: Valley City City Inspector Dave Andersen

Figure 4.2 – Arthur Grain Company Fertilizer Sales Building Layout



Source: Barnes County Auditor's Office

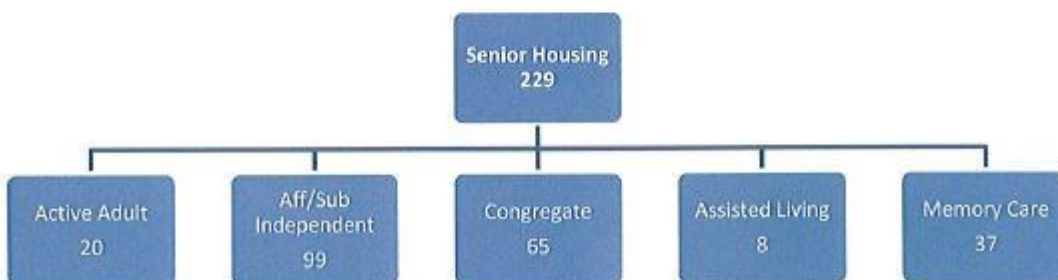
Figure 4.3 shows projected demand for housing in Barnes County from 2012 to 2020 from the Housing Needs Assessment for The North Dakota Planning Region VI. Projected increases in housing is critical to understanding where emergency services will be needed and where mitigation projects will have the great impact to mitigate hazards. Between 2012 and 2020, there will be a need for an additional 379 units of general occupancy housing, which consists of for-sale residential units and rental residents units, and 229 senior housing units. The need for additional of senior housing units indicates there will be growth in vulnerable populations in Barnes County if housing is built to accommodate this population.

Figure 4.3 – 2012 to 2020 Projected General Occupancy Demand Barnes County

Barnes County Projected General Occupancy Demand, 2012 – 2020



Barnes County Projected Senior Demand, 2017



Note: Because households are mobile and are willing to seek out various housing products in adjacent communities, these demand figures may experience fluctuations.

Source: Housing Needs Assessment for The North Dakota Planning Region VI

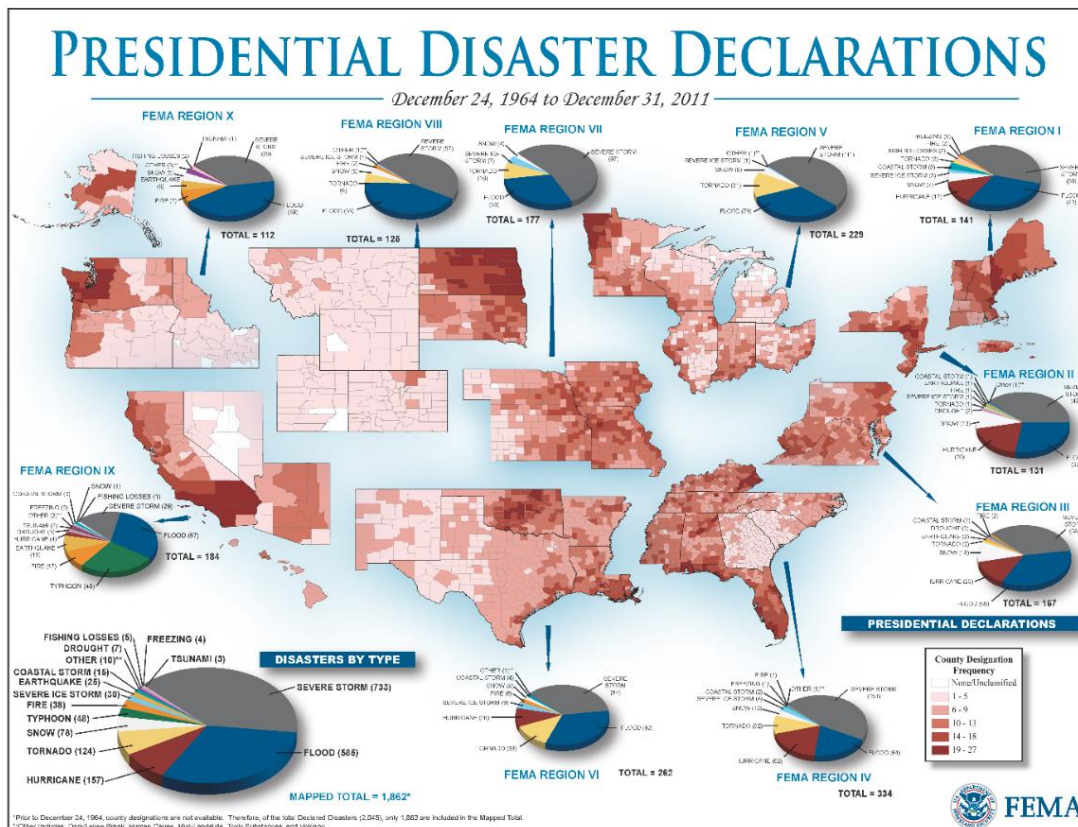
5. Threat and Hazard Identification and Risk Assessment

Barnes County has a history of damages to crops, livestock, people and property from natural and man-made disasters. In the updating of this plan, the Planning Committee and county and city officials identified 14 hazards and threats to be included in this plan because risk analysis showed that mitigation, planning, response, and preparedness would assist in limiting injury, loss of life, and loss of property. The following sections of this chapter detail the risk assessment for Barnes County and its jurisdictions for each of the 14 hazards.

The 14 hazards and threats are:

- Communicable Disease
- Dam Failure
- Drought
- Flood
- Geologic Hazard
- Hazardous Material Release
- Homeland Security Incident
- Severe Summer Weather
- Severe Winter Weather
- Shortage or Outage of Critical Materials or Infrastructure
- Transportation Accident
- Urban Fire/Structure Collapse
- Wildland Fire
- Windstorm

Figure 5.1 – 1964 to 2010 Presidential Disaster Declaration Frequency by FEMA Region



Source: Federal Emergency Management Agency

Barnes County history shows a high risk of damage from disasters. The FEMA Presidential Disaster Declaration map in Figure 5.1 shows that North Dakota and Barnes County are among areas in the nation with the most presidential disaster declarations in the past 50 years.

As indicated in Figure 5.1, Barnes County and the eastern third of North Dakota have had high frequencies of Presidential Disaster Declarations as shown by the dark shading of the counties. The frequency of declarations for severe storms and flooding highlight the need for continued mitigation in Barnes County pertaining to these disasters.

Barnes County has had 24 Presidential Disaster Declarations (Table 5.1), including declarations for flooding, spring flooding, blizzards, high winds, severe storms, ice jams, snow melt, and ground saturation. These declarations highlight the large level of losses experienced in Barnes County and the value of mitigation to reduce and/or eliminate losses to people and property.

Table 5.1 – 1953 to 2013 Presidential Disaster Declarations for Barnes County, N.D.

| Decision Number | Date | Disaster Description | Statewide Costs Constant 2009 (\$) | President |
|-----------------|------------|--|------------------------------------|-----------|
| 195 | 05/10/1965 | Flooding | 2,076,894 | Johnson |
| 216 | 03/23/1966 | Flooding | 6,144,924 | Johnson |
| 256 | 04/18/1969 | Flooding | 20,349,850 | Ford |
| 469 | 05/24/1975 | Flooding From Rains, Snowmelt | 5,821,137 | Ford |
| 475 | 07/11/1975 | Severe Storms, Flooding | 18,771,101 | Ford |
| 581 | 04/26/1979 | Severe Storms, Snowmelt, Flooding | 57,100,615 | Carter |
| 1001 | 07/26/1993 | Severe Storms, Flooding | 48,607,868 | Clinton |
| 1032 | 07/01/1994 | Severe Storms, Flooding | 6,426,384 | Clinton |
| 1050 | 05/16/1995 | Severe Storms, Flooding, Ground | 24,294,145 | Clinton |
| 1118 | 06/05/1996 | Severe Storms, Flooding, Ice Jams | 18,135,392 | Clinton |
| 1157 | 01/12/1997 | Severe Winter Storms, Blizzard | 21,264,168 | Clinton |
| 1174 | 04/07/1997 | Severe Flooding, Severe Winter Storm | 531,404,655 | Clinton |
| 1220 | 06/15/1998 | Flooding, Ground Saturation, Severe | 24,468,099 | Clinton |
| 1279 | 06/08/1999 | Severe Storms, Flooding, Snow, Ice | 145,619,808 | Clinton |
| 1334 | 06/27/2000 | Severe Storms, Flooding, Ground Saturation | 113,151,807 | Clinton |
| 1376 | 05/28/2001 | Severe Storms, Flooding, Ground Saturation | 45,117,082 | GWBush |
| 1483 | 2003 | Severe Storms, High Winds | 868,596 | GWBush |
| 3247 | 2005 | Hurricane Katrina | 24,233 | GWBush |
| 1713 | 07/17/2007 | Severe Storms, Flooding | 4,938,793 | GWBush |
| 1829 | 03/24/2009 | Severe Storms, Flooding | 107,590,628 | Obama |
| 1901 | 04/21/2010 | Severe Winter Storm | 25,545,350 | Obama |
| 1907 | 04/13/2010 | Flooding | 21,545,534 | Obama |
| 3309 | 03/14/2010 | Flooding | 4,872,449 | Obama |
| 1981 | 05/10/2011 | Severe Storms, Flooding | 336,484,916 | Obama |

Source: FEMA

Characteristics describing each hazard in the hazard profiles are in the risk assessment for Barnes County. Data for this plan was obtained from the 2014 North Dakota Multi-Hazard Mitigation Plan (ND MHMP), FEMA websites, and other agency sources. History in each hazard profile is a summation of data collected from National Oceanic and Atmosphere Administration (NOAA); National Climatic Data Center (NCDC); the Special Hazard Event and Losses Database for the United States (SHELDUS); local newspapers; city, county and state records; and oral history from county residents.

Data used to conduct the risk assessment included the 2010 Barnes County Multi-Hazard Mitigation Plan; updated hazard history based on information from NOAA, NCDC, SHELDUS, local newspapers, and state and local data; and a risk assessment conducted with each jurisdiction in Barnes County. Each risk assessment was conducted using the following process:

Impact is what damage or losses the hazard causes in a community.

| | |
|----------|--|
| Scored 1 | Negligible – less than 10% of the jurisdiction/people affected |
| Scored 2 | Limited – 10% to 25% of jurisdiction/people affected |
| Scored 3 | Critical – 25% to 50% of the jurisdiction/people affected |
| Scored 4 | Catastrophic – More than 50% of the jurisdiction/people affected |

Impact per hazard: Ranked _____. Why:

Frequency is how often the hazard occurs.

| | |
|----------|---|
| Scored 1 | Unlikely – history of events shows less than 1% chance hazard occur |
| Scored 2 | Possible – history of events shows between 1% to 10% chance hazard occurs |
| Scored 3 | Likely – history of events shows between 10% to 100% chance hazard occurs |
| Scored 4 | Highly likely – history of events shows nearly 100% chance hazard occurs |

Frequency per hazard: Ranked _____. Why:

Likelihood is how probable it is that the hazard will happen.

| | |
|----------|--|
| Scored 1 | Unlikely – less than 1% chance hazard will occur |
| Scored 2 | Possible – 1% to 10% chance hazard will occur |
| Scored 3 | Likely – 10% to 100% chance hazard will occur |
| Scored 4 | Highly likely – Nearly 100% chance hazard will occur |

Likelihood per hazard: Ranked _____. Why:

Vulnerability is the amount of

1. vulnerable areas, such as trailer courts, building construction, and blocked roads and
2. vulnerable population, individuals with special needs, elderly, day cares, and schools

Who and what is affected? When? Identify specific areas of vulnerability. Who will handle dealing with the hazard impact? What you have or lack: Equipment, vehicles, services available, shelters, buildings, and infrastructure

| | |
|----------|---|
| Scored 1 | Low vulnerability: Adequate resources in the jurisdiction to address any hazard |
|----------|---|

| | |
|----------|---|
| Scored 2 | Moderate vulnerability: Various resources in the jurisdiction |
| Scored 3 | High vulnerability: Few resources in the jurisdiction |
| Scored 4 | Very high vulnerability: Little to no resources in the jurisdiction |

Capability is the ability to protect itself against the hazard with resources (i.e. buildings, infrastructure, equipment, personnel, plans, technical, financial/tax base)

| | |
|----------|---|
| Scored 1 | Low capability: Little to no ability of the jurisdiction for mitigation |
| Scored 2 | Moderate capability: Few abilities of the jurisdiction for mitigation |
| Scored 3 | High capability: Various abilities of the jurisdiction for mitigation |
| Scored 4 | Very high capability: Adequate abilities of the jurisdiction for mitigation |

Capability per hazard: Ranked _____.Why:

The formula to determine the total is: Impact plus Frequency plus Likelihood plus Vulnerabilities minus Capabilities equals Total. Higher total scores indicate more vulnerability and lower scores indicate less vulnerability.

Table 5.2 summarizes the risk assessment scoring of each hazard at county and city jurisdictions. The individual results of each hazard assessment is repeated in each hazard section.

Table 5.2 – Barnes County Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | Jurisdiction: Barnes County | | | | |
|--|---------------|-----------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 4 | 3 | 3 | 2 | 12 |
| Dam Failure | 4 | 2 | 2 | 4 | 2 | 10 |
| Drought | 3 | 2 | 2 | 3 | 2 | 8 |
| Flood | 4 | 3 | 3 | 4 | 2 | 12 |
| Geologic Hazard | 2 | 3 | 2 | 3 | 2 | 8 |
| Hazardous Material Release | 4 | 4 | 4 | 4 | 1 | 15 |
| Homeland Security Incident | 4 | 3 | 4 | 4 | 1 | 14 |
| Severe Summer Weather | 3 | 4 | 4 | 3 | 2 | 12 |
| Severe Winter Weather | 4 | 4 | 4 | 3 | 2 | 13 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 4 | 4 | 3 | 2 | 12 |
| Transportation Accident | 4 | 3 | 4 | 3 | 2 | 12 |
| Urban Fire/Structure Collapse | 2 | 3 | 3 | 3 | 2 | 11 |
| Wildland Fire | 2 | 3 | 3 | 3 | 1 | 10 |
| Windstorm | 4 | 3 | 3 | 2 | 1 | 11 |

| Risk Assessment | | Jurisdiction: Dazey | | | | |
|--|---------------|---------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 3 | 3 | 2 | 8 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 2 | 2 | 3 | 2 | 9 |
| Flood | 4 | 4 | 4 | 4 | 2 | 14 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 3 | 3 | 1 | 11 |
| Homeland Security Incident | 3 | 1 | 2 | 3 | 1 | 8 |
| Severe Summer Weather | 3 | 2 | 3 | 3 | 2 | 9 |
| Severe Winter Weather | 4 | 4 | 4 | 4 | 2 | 14 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 4 | 3 | 2 | 10 |
| Transportation Accident | 3 | 2 | 3 | 2 | 2 | 8 |
| Urban Fire/Structure Collapse | 3 | 2 | 2 | 3 | 2 | 8 |
| Wildland Fire | 4 | 3 | 3 | 4 | 2 | 12 |
| Windstorm | 3 | 3 | 3 | 2 | 2 | 9 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 5.2 – Barnes County Jurisdiction Risk Assessment Scoring Summary - Continued

| Risk Assessment | | Jurisdiction: Fingal | | | | |
|--|---------------|-----------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 2 | 4 | 1 | 9 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 3 | 3 | 3 | 1 | 12 |
| Flood | 3 | 3 | 3 | 4 | 1 | 12 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 3 | 4 | 4 | 1 | 14 |
| Homeland Security Incident | 4 | 2 | 3 | 3 | 1 | 11 |
| Severe Summer Weather | 4 | 3 | 3 | 3 | 1 | 12 |
| Severe Winter Weather | 4 | 4 | 4 | 4 | 1 | 15 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 3 | 3 | 1 | 10 |
| Transportation Accident | 4 | 3 | 4 | 4 | 1 | 14 |
| Urban Fire/Structure Collapse | 3 | 3 | 3 | 4 | 1 | 12 |
| Wildland Fire | 3 | 3 | 3 | 3 | 1 | 11 |
| Windstorm | 4 | 3 | 3 | 4 | 1 | 13 |

| Risk Assessment | | Jurisdiction: Kathryn | | | | |
|--|---------------|------------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 2 | 3 | 2 | 7 |
| Dam Failure | 4 | 3 | 3 | 3 | 1 | 12 |
| Drought | 3 | 3 | 3 | 3 | 2 | 10 |
| Flood | 3 | 2 | 3 | 3 | 2 | 9 |
| Geologic Hazard | 4 | 3 | 3 | 4 | 1 | 13 |
| Hazardous Material Release | 2 | 2 | 2 | 2 | 1 | 7 |
| Homeland Security Incident | 2 | 2 | 1 | 1 | 2 | 4 |
| Severe Summer Weather | 3 | 2 | 2 | 2 | 2 | 7 |
| Severe Winter Weather | 3 | 3 | 3 | 2 | 2 | 9 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 2 | 2 | 2 | 7 |
| Transportation Accident | 1 | 2 | 2 | 2 | 1 | 6 |
| Urban Fire/Structure Collapse | 2 | 2 | 3 | 3 | 2 | 8 |
| Wildland Fire | 2 | 2 | 2 | 3 | 2 | 7 |
| Windstorm | 3 | 3 | 3 | 2 | 2 | 9 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 5.2 – Barnes County Jurisdiction Risk Assessment Scoring Summary - Continued

| Risk Assessment | | Jurisdiction: Leal | | | | |
|--|---------------|---------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 2 | 1 | 2 | |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 2 | 2 | 1 | 1 | 3 | 3 |
| Flood | 4 | 2 | 3 | 3 | 2 | 10 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 4 | 1 | 13 |
| Homeland Security Incident | 4 | 2 | 2 | 3 | 2 | 9 |
| Severe Summer Weather | 4 | 3 | 3 | 3 | 2 | 11 |
| Severe Winter Weather | 3 | 3 | 4 | 4 | 2 | 12 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 3 | 4 | 4 | 2 | 12 |
| Transportation Accident | 4 | 2 | 3 | 4 | 2 | 11 |
| Urban Fire/Structure Collapse | 2 | 2 | 2 | 3 | 1 | 8 |
| Wildland Fire | 4 | 2 | 2 | 3 | 1 | 10 |
| Windstorm | 4 | 3 | 3 | 3 | 2 | 11 |

| Risk Assessment | | Jurisdiction: Litchville | | | | |
|--|---------------|---------------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 2 | 1 | 3 | 3 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 3 | 2 | 2 | 2 | 3 | 6 |
| Flood | 2 | 2 | 2 | 2 | 2 | 6 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 3 | 2 | 1 | 2 | 3 | 5 |
| Homeland Security Incident | 1 | 1 | 1 | 1 | 2 | 2 |
| Severe Summer Weather | 3 | 3 | 4 | 3 | 1 | 12 |
| Severe Winter Weather | 2 | 3 | 1 | 2 | 3 | 5 |
| Shortage or Outage of Critical Materials or Infrastructure | 2 | 1 | 2 | 2 | 2 | 5 |
| Transportation Accident | 1 | 1 | 1 | 2 | 3 | 2 |
| Urban Fire/Structure Collapse | 1 | 1 | 2 | 3 | 2 | 5 |
| Wildland Fire | 2 | 2 | 2 | 2 | 3 | 5 |
| Windstorm | 2 | 2 | 2 | 2 | 3 | 5 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 5.2 – Barnes County Jurisdiction Risk Assessment Scoring Summary - Continued

| Risk Assessment | | Jurisdiction: Nome | | | | |
|--|---------------|---------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 1 | 3 | 1 | 6 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 2 | 1 | 1 | 4 | 1 | 7 |
| Flood | 3 | 2 | 3 | 3 | 1 | 10 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 1 | 2 | 3 | 1 | 9 |
| Homeland Security Incident | 4 | 1 | 1 | 2 | 1 | 7 |
| Severe Summer Weather | 4 | 3 | 3 | 4 | 1 | 13 |
| Severe Winter Weather | 3 | 3 | 3 | 3 | 1 | 11 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 4 | 3 | 3 | 1 | 12 |
| Transportation Accident | 2 | 2 | 3 | 3 | 2 | 8 |
| Urban Fire/Structure Collapse | 3 | 2 | 3 | 3 | 2 | 9 |
| Wildland Fire | 3 | 2 | 2 | 2 | 2 | 7 |
| Windstorm | 4 | 3 | 3 | 3 | 1 | 12 |

| Risk Assessment | | Jurisdiction: Oriska | | | | |
|--|---------------|-----------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 4 | 4 | 1 | 11 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 2 | 3 | 2 | 2 | 9 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Flood | 3 | 3 | 4 | 4 | 2 | 12 |
| Hazardous Material Release | 4 | 1 | 4 | 4 | 1 | 12 |
| Homeland Security Incident | 2 | 2 | 2 | 2 | 1 | 7 |
| Severe Summer Weather | 3 | 3 | 4 | 3 | 2 | 11 |
| Severe Winter Weather | 3 | 4 | 4 | 3 | 3 | 11 |
| Shortage or Outage of Critical Materials or Infrastructure | 2 | 2 | 2 | 2 | 1 | 7 |
| Transportation Accident | 4 | 2 | 3 | 3 | 2 | 10 |
| Urban Fire/Structure Collapse | 2 | 3 | 3 | 3 | 1 | 10 |
| Wildland Fire | 4 | 2 | 2 | 2 | 2 | 8 |
| Windstorm | 3 | 2 | 2 | 3 | 4 | 6 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 5.2 – Barnes County Jurisdiction Risk Assessment Scoring Summary - Continued

| Risk Assessment | | Jurisdiction: Pillsbury | | | | |
|--|---------------|--------------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 2 | 3 | 1 | 7 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 2 | 2 | 3 | 2 | 2 | 7 |
| Flood | 3 | 3 | 3 | 2 | 2 | 9 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 3 | 1 | 12 |
| Homeland Security Incident | 2 | 2 | 2 | 2 | 1 | 7 |
| Severe Summer Weather | 2 | 4 | 3 | 2 | 1 | 10 |
| Severe Winter Weather | 3 | 4 | 4 | 3 | 1 | 13 |
| Shortage or Outage of Critical Materials or Infrastructure | 2 | 2 | 2 | 2 | 2 | 6 |
| Transportation Accident | 4 | 2 | 3 | 3 | 1 | 11 |
| Urban Fire/Structure Collapse | 2 | 2 | 2 | 2 | 1 | 7 |
| Wildland Fire | 2 | 2 | 2 | 4 | 2 | 8 |
| Windstorm | 2 | 3 | 3 | 3 | 1 | 13 |

| Risk Assessment | | Jurisdiction: Rogers | | | | |
|--|---------------|-----------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 3 | 3 | 1 | 8 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 2 | 2 | 3 | 1 | 10 |
| Flood | 3 | 3 | 4 | 3 | 1 | 12 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 3 | 1 | 1 | 9 |
| Homeland Security Incident | 2 | 2 | 2 | 3 | 1 | 8 |
| Severe Summer Weather | 4 | 3 | 3 | 3 | 2 | 11 |
| Severe Winter Weather | 3 | 3 | 4 | 4 | 2 | 12 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 3 | 3 | 3 | 2 | 10 |
| Transportation Accident | 3 | 2 | 4 | 4 | 1 | 12 |
| Urban Fire/Structure Collapse | 3 | 2 | 2 | 3 | 1 | 9 |
| Wildland Fire | 3 | 3 | 4 | 2 | 2 | 10 |
| Windstorm | 4 | 2 | 3 | 3 | 2 | 10 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 5.2 – Barnes County Jurisdiction Risk Assessment Scoring Summary - Continued

| Risk Assessment | | Jurisdiction: Sanborn | | | | |
|--|---------------|------------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 2 | 3 | 3 | 1 | 11 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 1 | 2 | 2 | 1 | 8 |
| Flood | 4 | 3 | 3 | 2 | 1 | 11 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 4 | 1 | 13 |
| Homeland Security Incident | 4 | 1 | 2 | 4 | 1 | 10 |
| Severe Summer Weather | 4 | 2 | 4 | 3 | 1 | 12 |
| Severe Winter Weather | 4 | 3 | 4 | 3 | 1 | 13 |
| Shortage or Outage of Critical Materials or Infrastructure | 4 | 4 | 4 | 3 | 1 | 14 |
| Transportation Accident | 4 | 2 | 4 | 4 | 1 | 13 |
| Urban Fire/Structure Collapse | 2 | 2 | 3 | 4 | 3 | 8 |
| Wildland Fire | 3 | 2 | 3 | 3 | 3 | 8 |
| Windstorm | 4 | 3 | 3 | 3 | 2 | 11 |

| Risk Assessment | | Jurisdiction: Sibley | | | | |
|--|---------------|-----------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 2 | 2 | 3 | 1 | 10 |
| Dam Failure | 4 | 2 | 2 | 3 | 1 | 10 |
| Drought | 2 | 2 | 2 | 2 | 1 | 7 |
| Flood | 4 | 3 | 4 | 4 | 1 | 14 |
| Geologic Hazard | 4 | 2 | 4 | 4 | 1 | 13 |
| Hazardous Material Release | 4 | 2 | 1 | 2 | 1 | 8 |
| Homeland Security Incident | 4 | 2 | 1 | 3 | 1 | 9 |
| Severe Summer Weather | 4 | 2 | 3 | 4 | 1 | 12 |
| Severe Winter Weather | 4 | 4 | 4 | 3 | 1 | 14 |
| Shortage or Outage of Critical Materials or Infrastructure | 4 | 2 | 3 | 4 | 1 | 12 |
| Transportation Accident | 3 | 2 | 2 | 3 | 1 | 9 |
| Urban Fire/Structure Collapse | 3 | 2 | 4 | 3 | 1 | 11 |
| Wildland Fire | 4 | 2 | 3 | 4 | 1 | 12 |
| Windstorm | 4 | 4 | 2 | 4 | 1 | 13 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Table 5.2 – Barnes County Jurisdiction Risk Assessment Scoring Summary - Continued

| Risk Assessment | | Jurisdiction: Valley City | | | | |
|--|---------------|----------------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 3 | 3 | 3 | 3 | 10 |
| Dam Failure | 4 | 1 | 1 | 4 | 2 | 8 |
| Drought | 1 | 2 | 2 | 2 | 3 | 4 |
| Flood | 4 | 4 | 4 | 4 | 1 | 15 |
| Geologic Hazard | 3 | 2 | 3 | 3 | 1 | 10 |
| Hazardous Material Release | 4 | 2 | 3 | 4 | 1 | 12 |
| Homeland Security Incident | 4 | 3 | 3 | 4 | 2 | 12 |
| Severe Summer Weather | 3 | 4 | 4 | 2 | 3 | 10 |
| Severe Winter Weather | 3 | 4 | 4 | 2 | 3 | 10 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 3 | 4 | 2 | 10 |
| Transportation Accident | 4 | 4 | 4 | 4 | 1 | 13 |
| Urban Fire/Structure Collapse | 4 | 3 | 3 | 3 | 2 | 11 |
| Wildland Fire | 4 | 4 | 4 | 3 | 2 | 13 |
| Windstorm | 3 | 4 | 4 | 2 | 3 | 10 |

| Risk Assessment | | Jurisdiction: Wimbledon | | | | |
|--|---------------|--------------------------------|-------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 2 | 3 | 2 | 2 | 9 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 3 | 3 | 4 | 2 | 12 |
| Flood | 2 | 3 | 3 | 2 | 2 | 8 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 4 | 2 | 12 |
| Homeland Security Incident | 4 | 2 | 2 | 4 | 1 | 11 |
| Severe Summer Weather | 3 | 3 | 3 | 3 | 2 | 10 |
| Severe Winter Weather | 4 | 4 | 4 | 3 | 2 | 13 |
| Shortage or Outage of Critical Materials or Infrastructure | 4 | 3 | 3 | 4 | 2 | 12 |
| Transportation Accident | 4 | 3 | 4 | 4 | 2 | 13 |
| Urban Fire/Structure Collapse | 4 | 2 | 3 | 3 | 3 | 9 |
| Wildland Fire | 4 | 3 | 2 | 2 | 3 | 8 |
| Windstorm | 4 | 4 | 4 | 3 | 1 | 14 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

5.1 Communicable Disease

Including Human, Animal, and Plant Diseases.

Characteristics

Communicable disease is an illness that is caused by an infectious agent, such as bacteria, virus, fungi or parasites and/or toxin microorganisms and is transmittable from an infected person, animal or plant to another person, animal or plant. Some diseases are passed on by direct or indirect contact with infected person or with excretions. Most diseases are spread through contact or close proximity because the causative bacteria or viruses are airborne. Diseases can be spread by plants, animals and insects. The causes and significance of diseases vary. Such diseases can devastate human, animal, and plant populations as well as the economy.

A communicable disease could affect anywhere from only a few individuals, animals or plants to covering a large geographic or numeric extent. The entire county could be impacted affecting schools, businesses, and medical facilities. Elderly, young-children, and individuals with suppressed immune systems are at greatest risk. It could overwhelm local health care resources, force quarantines, and result in mass casualties, requiring the need for mass care facilities. Through the use of vaccines, members of the community can be protected against such diseases if the vaccines are available. Points of distribution may be required to administer mass vaccinations.

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, like the H1N1 flu of 2009. Terrorism experts also theorize the possibility of attack using biological agents.

Natural illnesses of concern include: Influenza, Meningitis, Pertussis (Whooping Cough), Measles, Norwalk Virus, Severe Acute Respiratory Syndrome (SARS), and food-borne illnesses, such as E. Coli and Salmonella outbreaks, among others. These diseases can infect populations rapidly, particularly through groups of people in close proximity such as schools, assisted living and nursing facilities, and workplaces.

Animal and plant diseases, those that infect livestock and crops, can hurt the agricultural community and lead to severe economic loss. They often have negative economic impact and lead to a loss of jobs. Anthrax is a disease found in livestock. The bacteria *Bacillus Anthracis* causes anthrax. Spores of the bacteria lie dormant in the ground for decades and become active under ideal conditions, such as heavy rainfall, flooding and drought. When animals graze or consume forage or water contaminated with spores, they can possibly develop anthrax. (Source: N.D. Department of Agriculture)

History

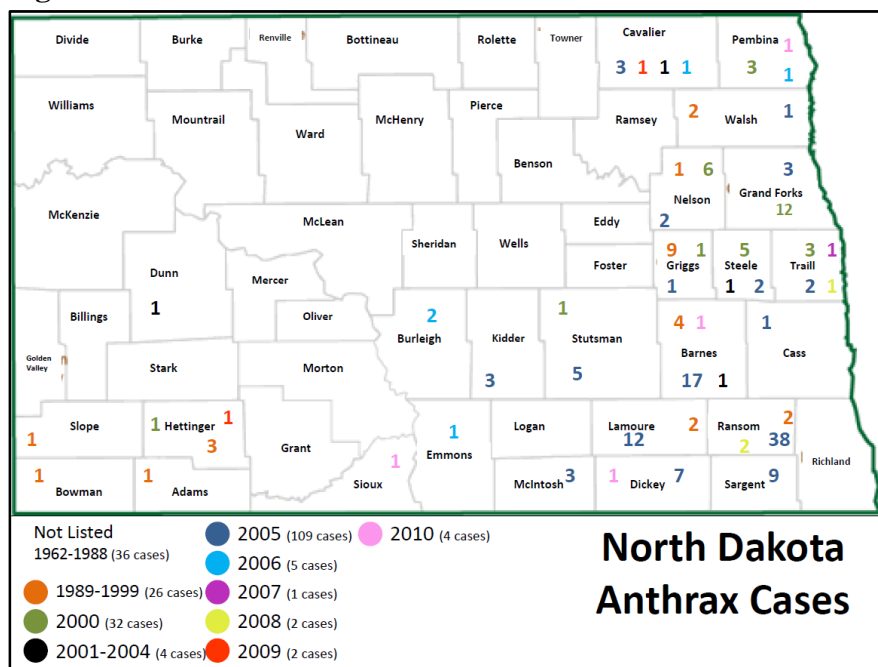
According to the City-County Health District, the city of Valley City experienced Pertussis issues in 2005 in school-age children due to exposure from an unimmunized child. An H1N1 pandemic occurred in 2009 and city-county health administered large amounts of vaccines to protect local populations. Seasonal influenza outbreaks do occur annually. Influenza is the most common type of communicable disease occurrence in Barnes County. Between 2005 and June, 2014, 251 cases of influenza and 16 cases of West Nile virus were reported in Barnes County. According to the 2010 Barnes County MHMP, the first recorded death from the West Nile virus occurred in Barnes County in 2006.

Table 5.1.3 shows incident history of 21 communicable diseases in Barnes County.

Anthrax has been most frequently reported in northeast, southeast and south central North Dakota, but has been suspected in almost every part of the state. Barnes County had four reported cases between 1989 and 1999, one case between 2001 and 2004, 17 cases in 2005, and 1 case in 2010. Figure 5.1.1 shows the number of incidents of anthrax in Barnes County and the state. Dry pastures and short grass provided ideal conditions for livestock to ingest anthrax spores and develop the disease. Remarks regarding the case of anthrax in 2010 resulting in livestock loss is shown in Table 5.1.4.

On October 11, 2012, Barnes County livestock producers were warned of anthrax danger, due to a confirmed case in western North Dakota; however, no cases were reported in 2012 in Barnes County. Due to efforts by veterinarians and extension agents to encourage producers to vaccinate their animals, there has been a dramatic reduction in livestock deaths, according to the N.D. Department of Agriculture.

Figure 5.1.1 – 1989 to 2010 North Dakota Anthrax Cases—Barnes County



Source: N.D. Department of Agriculture

Crop loss from communicable disease is tracked by the United States Department of Agriculture Risk Management Agency (RMA). The RMA provides data on the crop type affected, net claimed acres, indemnity, loss liability, loss cost and the number of policies covered. The net claimed acres is the total acres planted for crops in the county for the given year. Liability is the total value in crops planted in the county for the given year. Indemnity is the amount paid to cover insurance claims from crop loss due to disease. The loss liability of crops was \$11,617,110 in Barnes County between 1990 and 2013 on 11,362 acres. Indemnity paid was \$5,520,049 resulting in losses of 48 percent of total liability. Crop loss indemnity paid over the 24-year period resulted in an annual average of \$230,002. Detailed hazard data is available under the Hazard Profile and History section at the end of this chapter.

There have been no declared disasters or emergencies pertaining to communicable disease in humans, animals or plants in Barnes County.

Probability and Magnitude

Hazard history was gathered from the N.D. Dept. of Health with data showing crop losses from communicable disease obtained from the USDA Risk Management Agency. Data from the N.D. Department of Health illustrates 251 cases of influenza and 16 cases of West Nile virus between 2005 and June 2014. Approximately 17 cases of anthrax occurred in 2005 and one livestock death was recorded in 2010. Crop loss data shows 39 instances of crop loss from disease over a 24-year period from 1990 through March 2013. Indemnity payments to cover crop loss averaged approximately \$230,000 each year. Based on data gathered, the probability of communicable disease in humans, animals and plants is 100 percent as incidences occur each year. The magnitude of such events is subjective to each year and depends on a variety of weather and economic-related factors.

Risk Assessment

Table 5.1.1 shows the risk assessment as determined by individual jurisdictions and the Planning Committee for communicable disease. The risk assessment methodology can be found in the beginning of Chapter 5, Risk Assessment Hazard Profiles. The total in Table 5.1.1 represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 5.1.1 – Risk Assessment Summary Communicable Disease Scored Chart

| Communicable Disease | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|-----------------------------|---------------|------------------|-------------------|----------------------|---------------------|--------------|
| Barnes County | 4 | 4 | 3 | 3 | 2 | 12 |
| Dazey | 2 | 2 | 3 | 3 | 2 | 8 |
| Fingal | 2 | 2 | 2 | 4 | 1 | 9 |
| Kathryn | 2 | 2 | 2 | 3 | 2 | 7 |
| Leal | 2 | 2 | 2 | 1 | 2 | 5 |
| Litchville | 1 | 2 | 2 | 1 | 3 | 3 |
| Nome | 1 | 2 | 1 | 3 | 1 | 6 |
| Oriska | 2 | 2 | 4 | 4 | 1 | 11 |
| Pillsbury | 1 | 2 | 2 | 3 | 1 | 7 |
| Rogers | 1 | 2 | 3 | 3 | 1 | 8 |
| Sanborn | 4 | 2 | 3 | 3 | 1 | 11 |
| Sibley | 4 | 2 | 2 | 3 | 1 | 10 |
| Valley City | 4 | 3 | 3 | 3 | 3 | 10 |
| Wimbledon | 4 | 2 | 3 | 2 | 2 | 9 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|---|
| Seasonal Pattern | None, Flu has been fall and winter, now can be year round |
| Duration | Could be multiple waves, 9 months, could be ongoing |
| Speed of Onset | 6 weeks or less |

Capabilities of and Vulnerabilities to Jurisdictions

Upon review of the statistics from the N.D. Department of Health, livestock loss from the Valley City Times-Record, and crop loss data from plant disease from the Risk Management Agency, the frequency and likelihood of communicable disease in Barnes County varied based on site specific accounts by residents, the agriculture industry, and weather patterns for each specific year.

Capabilities and vulnerabilities of jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Hazard scoring notes and other information gathered at jurisdictional meetings pertaining to each jurisdiction can be found in Chapter 8, Jurisdictions.

Barnes County

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of economy, livestock, and crops have been experienced • Total crop loss of \$11,617,110 between 1990 and 2013 • Some people get sick each year with fatalities being possible • Pandemic disease could result in mass casualties due to limited medical facilities/funeral homes and medical materials in county • Extended emergency response times due to rural nature of county • Overtime for departments/agencies for increase staff time • “Fear Factor” throughout the community and angst • Shortages of medical supplies at Mercy Hospital if outbreak occurred |
| Frequency | 4 | <ul style="list-style-type: none"> • Hazard has occurred in humans, plants and animals in the county each year to varying degrees of severity • Flu occurs more often than West Nile virus • Indemnity covering crop loss has averaged approximately \$230,000 per year between 1990 and 2013 • 17 cases of Anthrax in 2005 alone |
| Likelihood | 3 | <ul style="list-style-type: none"> • Disease in humans will continue to occur on an annual basis • Disease in plants and animals is a highly likely to occur every year depending on weather patterns and the amount of moisture • Flu has been occurring more often in recent years • Projected population growth through 2030 • Increase in vulnerable populations • Increase in traffic on all transportation modes • Increase in exposure to disease from migration of domestic and international people into the state and region |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 2,632 people under the age of 20 and 2,170 people over the age of 65 in the city representing 24 percent and 20 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur • More vulnerable: Vaccine shortages do occur at times • More vulnerable: Wildlife habitats • More vulnerable: One hospital in Barnes County • More vulnerable: Barnes County Ambulance – rural areas may have prolonged response • More vulnerable: No stockpile of medical supplies in small towns • More vulnerable: Smaller communities have no medical facilities • More vulnerable: Valley City State University senior facilities such as assisted living, congregate and skilled nursing • More vulnerable: Approximately 401 students living in on-campus housing at Valley City State University • More vulnerable: Approximately 260 units of senior apartments, assisted living, skilled nursing and congregate living • Less vulnerable: Better education and communication have increased awareness of hazard |
| Capability | 2 | <ul style="list-style-type: none"> • City-County Health District with grant writing staff and administration • Sizeable tax base • Central Valley City United in Jamestown |

| | |
|--|---|
| | <ul style="list-style-type: none"> • NDSU/Barnes County Extension Service • Planning and regulatory through infrastructure maintenance programs to control vegetative growth and storm water runoff regulations to limit standing water • Active emergency management department with detailed plans to educate the public on communicable disease available on the department’s website |
|--|---|

Vulnerabilities to County-Owned Buildings and Property

Most structures remain unaffected by impacts from communicable disease as people, plants and animals are susceptible to the hazard. Buildings can potentially become contaminated with a communicable disease such as mold, which can potentially render the building uninhabitable. This can be extremely expensive to remediate.

Vulnerabilities of Critical Facilities and Infrastructure

Since humans, animals and plants are affected by communicable disease, critical facilities and infrastructure are relatively unaffected in structural terms. However, critical facilities such as hospitals and clinics can become quickly overwhelmed if an outbreak of communicable disease occurs in humans. There is a hospital and two medical clinics in Barnes County located in Valley City. Information on these facilities is shown in Chapter 4, Profile and Inventory. Similarly, emergency services can also be stressed as the county and its population are spread out over a large geographic area. Other facilities at risk are those that house large populations in close quarters such as public schools, assisted living facilities and nursing homes. The vulnerability and exposure to communicable disease are likely to increase due to increasing frequency of the West Nile virus and Influenza, an aging population, growing enrollments at certain school districts (despite an overall decline in populations under 19) in Barnes County. The emergence of the Ebola virus may also increase vulnerability to communicable disease in Barnes County as the portion of the student body at Valley City State University has become increasingly international.

As shown in Table 5.1.2, youth populations age 19 and under consisted of 26.3 percent of the Barnes County population in 2000 and decreased to 23.8 percent by 2010. The 65 to 74 population consisted of 8.5 percent of the Barnes County population in 2000 and increased to 9.4 percent by 2010. Conversely, the 75+ population consisted of 11.3 percent of the Barnes County population in 2000 and decreased to 10.3 percent by 2010. A summary of county and city populations in Barnes County is shown in Chapter 4, Profile and Inventory.

Table 5.1.2 – 2000 to 2010 Barnes County Vulnerable Populations by Age

| Age Group | 2000 | 2010 | Percent of Population 2000 | Percent of Population 2010 |
|-----------|-------|-------|----------------------------|----------------------------|
| Under 19 | 3,099 | 2,632 | 26.3 percent | 23.8 percent |
| 65 to 74 | 1,005 | 1,035 | 8.5 percent | 9.4 percent |
| 75+ | 1,327 | 1,135 | 11.3 percent | 10.3 percent |

Source: Housing Needs Assessment for The North Dakota Planning Region VI

Due to livestock in the county, veterinary services can also become overwhelmed in the case of an outbreak in farm animals and livestock. The onset of stress to veterinarian and medical facilities can occur quickly with limited personnel and resources in counties with rural areas such as Barnes County.

Vulnerabilities to New and Future Development

New development would largely avoid impact by communicable disease and not be vulnerable. However, with the lack of building code in smaller jurisdictions, new structures could be susceptible to deterioration from contamination if structures are not constructed properly, lacking windows and other construction materials of higher quality.

Data Limitations and Other Key Documents

Increased public awareness and education are a primary reasons for fewer losses from communicable disease. The lack of emergency action plans in most jurisdictions in Barnes County results in the inability to track loss estimates. Statistics were not available for Winter Wheat in North Dakota as the Risk Management Agency does not insure this type of crop.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- Barnes County Department of Health, Pandemic Influenza Response 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
- Barnes County Emergency Operations Plan

Hazard Profile and History

Barnes County has had limited history of communicable disease in humans and animals. The majority of that history is shown in Table 5.1.3. History of crop losses from communicable disease is shown in Table 5.1.4. Table 5.1.5 shows the history of communicable disease in animals in Barnes County. Newspaper articles on hazard history and mitigation for the hazard from the Valley City Times-Record and the Dickey County Leader can be found after Table 5.1.5. Hazard history from the previously FEMA-approved plan can be found after the newspaper articles.

Influenza cases, along with **West Nile virus** and 15 other communicable diseases in Barnes County, are shown in Table 5.1.3. Between 2005 and June 2014, the county reported 251 cases of influenza, 44 cases of Hepatitis C, 88 cases of staph infections, 23 cases of strep and vancomycin each, and 16 cases of West Nile Virus. Influenza typically impacts vulnerable populations such as the elderly and children under the age of 18 the most. Data on the age of individuals reporting cases of influenza and the location of these individuals was not available.

Table 5.1.3 –2005 to June 2014 Reported Communicable Disease Cases in Barnes County

| Cases by year | | | | | | | | | | | |
|--|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|---------------|------------|
| County: Barnes County | | | | | | | | | | | |
| *** Investigation Status***: Closed, Completed | | | | | | | | | | | |
| *** Disease classification status***: Confirmed, Probable | | | | | | | | | | | |
| Report Time: 06/17/2014 12:35 PM | | | | | | | | | | | |
| Disease | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 (YTD) | Total |
| Campylobacteriosis | 0 | 3 | 1 | 0 | 1 | 1 | 2 | 0 | 2 | 0 | 10 |
| Chickenpox (varicella) | 0 | 1 | 2 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 7 |
| Cryptosporidiosis | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| E.coli, shiga-toxin producing | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Giardiasis | 1 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 5 |
| Hepatitis B | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 3 |
| Hepatitis C | 1 | 7 | 4 | 7 | 1 | 2 | 4 | 4 | 9 | 5 | 44 |
| Influenza | 20 | 12 | 10 | 55 | 56 | 1 | 17 | 27 | 39 | 14 | 251 |
| Lyme Disease | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| Mumps | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Pertussis | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 4 |
| Salmonellosis | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 3 | 1 | 8 |
| Shigellosis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Staphylococcus aureus, resistant (MRSA, VISA, VRSA) | 47 | 28 | 5 | 1 | 1 | 0 | 2 | 2 | 1 | 1 | 88 |
| Streptococcus Group B Perinatal | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Streptococcus infection, invasive | 2 | 0 | 0 | 2 | 2 | 1 | 1 | 9 | 2 | 4 | 23 |
| Streptococcus pneumoniae, invasive | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 3 | 2 | 1 | 10 |
| Unknown/Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Vancomycin Resistant Enterococcus | 0 | 0 | 3 | 2 | 2 | 2 | 7 | 4 | 3 | 0 | 23 |
| Vibrio cholerae (O1 and O139) and other vibrio sp. | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| West Nile Infection | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 9 | 3 | 0 | 16 |
| Totals | 95 | 78 | 63 | 119 | 88 | 27 | 54 | 80 | 85 | 36 | 725 |

Source: North Dakota Department of Health, ELC Manager

Livestock Loss. Disease can cause loss of livestock. However, disease is not the only cause of livestock loss.

Table 5.1.4 shows livestock losses from communicable disease. The following information was provided by the Valley City Times-Record showing one incidence of livestock loss in 2010.

Table 5.1.4 – Livestock Loss from Communicable Disease – Barnes County

| Begin Date | Injuries | Fatalities | Property Damage | Crop Damage | Remarks | Source |
|-------------------|-----------------|-------------------|------------------------|--------------------|---|--------------------------|
| 7/7/2010 | 0 | 1 | \$0.00 | \$0.00 | Single case of anthrax in Barnes County resulting in the death of a beef cow. | Valley City Times-Record |
| Total | 0 | 1 | \$0.00 | \$0.00 | | |

Source: Valley City Times-Record

Crop Loss. Disease can cause crop loss. However, disease is not the only cause of crop loss.

Table 5.1.5 shows crop losses from communicable disease. The following information was provided by the U.S. Department of Agriculture Risk Management Agency, Billings Office, documenting crop losses in Barnes County from 1990 to 2013.

Table 5.1.5 – 1990 to 2013 Barnes County Crop Loss Losses Covered by Crop Insurance

| Crop Year | Crop | Crop Type | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|-----------|------------|-------------------|---------------|-------------------|-----------|----------------|-----------|--------------|
| 1990 | Sunflowers | Confectionery | Plant Disease | 339 | \$9,474 | \$23,953 | 40% | 6 |
| 1990 | Sunflowers | Oil | Plant Disease | 124 | \$2,597 | \$10,333 | 25% | 4 |
| 1991 | Barley | Spring | Plant Disease | 441 | \$8,813 | \$30,208 | 29% | 9 |
| 1991 | Wheat | No Type Specified | Plant Disease | 7,767 | \$181,543 | \$449,177 | 40% | 71 |
| 1991 | Oats | No Type Specified | Plant Disease | 60 | \$640 | \$2,505 | 26% | 4 |
| 1993 | Wheat | No Type Specified | Plant Disease | 3,459 | \$99,282 | \$211,538 | 47% | 23 |
| 1993 | Barley | Spring | Plant Disease | 810 | \$18,485 | \$49,573 | 37% | 10 |
| 1993 | Barley | Spring Malting | Plant Disease | 721 | \$27,967 | \$53,033 | 53% | 11 |
| 1994 | Barley | Spring | Plant Disease | 186 | \$3,270 | \$14,048 | 23% | 4 |
| 1994 | Barley | Spring Malting | Plant Disease | 148 | \$3,090 | \$11,182 | 28% | 4 |
| 1994 | Wheat | No Type Specified | Plant Disease | 3,263 | \$67,914 | \$223,771 | 30% | 21 |
| 1994 | Sunflowers | No Type Specified | Plant Disease | 578 | \$13,740 | \$43,861 | 31% | 10 |
| 1995 | Wheat | No Type Specified | Plant Disease | 385 | \$6,193 | \$29,624 | 21% | 6 |
| 1996 | Wheat | No Type Specified | Plant Disease | 496 | \$18,414 | \$38,925 | 47% | 4 |
| 1996 | Sunflowers | Oil | Plant Disease | 1,124 | \$52,970 | \$104,181 | 51% | 12 |
| 1997 | Wheat | No Type Specified | Plant Disease | 24,729 | \$758,577 | \$2,201,944 | 34% | 135 |
| 1997 | Sunflowers | Confectionery | Plant Disease | 558 | \$29,238 | \$56,545 | 52% | 11 |
| 1997 | Sunflowers | Oil | Plant Disease | 4,032 | \$191,914 | \$362,212 | 53% | 46 |
| 1997 | Barley | Spring | Plant Disease | 1,833 | \$67,260 | \$139,254 | 48% | 20 |
| 1998 | Barley | Spring | Plant Disease | 503 | \$16,841 | \$39,342 | 43% | 7 |

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| Crop Year | Crop | Crop Type | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|--------------|------------|-------------------|---------------|-------------------|--------------------|---------------------|------------|--------------|
| 1998 | Sunflowers | Oil | Plant Disease | 442 | \$12,989 | \$30,724 | 42% | 6 |
| 1998 | Wheat | No Type Specified | Plant Disease | 3,129 | \$94,401 | \$244,143 | 39% | 34 |
| 1999 | Wheat | Durum | Plant Disease | 17,446 | \$1,984,268 | \$2,890,324 | 69% | 61 |
| 1999 | Barley | Spring | Plant Disease | 597 | \$15,605 | \$42,538 | 37% | 15 |
| 1999 | Wheat | Spring | Plant Disease | 9,262 | \$268,946 | \$771,843 | 35% | 76 |
| 1999 | Sunflowers | Oil | Plant Disease | 10,748 | \$438,007 | \$989,759 | 44% | 102 |
| 1999 | Sunflowers | Confectionery | Plant Disease | 1,614 | \$120,989 | \$200,750 | 60% | 19 |
| 2000 | Sunflowers | Oil | Plant Disease | 214 | \$10,360 | \$17,920 | 58% | 4 |
| 2000 | Wheat | Spring | Plant Disease | 354 | \$11,697 | \$34,286 | 34% | 4 |
| 2001 | Wheat | Spring | Plant Disease | 1,137 | \$35,038 | \$104,352 | 34% | 8 |
| 2001 | Wheat | Durum | Plant Disease | 2,482 | \$151,598 | \$303,147 | 50% | 9 |
| 2001 | Barley | Spring | Plant Disease | 1,290 | \$73,468 | \$136,203 | 54% | 6 |
| 2002 | Wheat | Spring | Plant Disease | 2,063 | \$68,787 | \$212,417 | 32% | 16 |
| 2003 | Barley | Spring | Plant Disease | 0 | \$76,219 | \$136,351 | 56% | 8 |
| 2004 | Barley | Spring | Plant Disease | 0 | \$58,246 | \$58,244 | 100% | 7 |
| 2004 | Sunflowers | Oil | Plant Disease | 4,561 | \$253,444 | \$646,415 | 39% | 37 |
| 2005 | Wheat | Spring | Mycotoxin | 1,177 | \$53,377 | \$124,853 | 43% | 5 |
| 2005 | Wheat | Spring | Plant Disease | 2,112 | \$59,721 | \$205,214 | 29% | 18 |
| 2011 | Wheat | Spring | Mycotoxin | 1,181 | \$154,667 | \$372,418 | 42% | 8 |
| Total | | | | 111,362 | \$5,520,049 | \$11,617,110 | 48% | 861 |

Source: United States Department of Agriculture Risk Management Agency

The following articles on incidents of communicable disease were gathered from the Valley City Times-Record and the Dickey County Leader. Articles on mitigation are found after the history of the hazard.

Hazard History Articles

July 23, 2010 A beef cow died from anthrax. A single case of anthrax has been confirmed in south central Barnes County where it had been reported in the past said the deputy state veterinarian. (Source: Valley City Times-Record)

October 14, 2010 Valley City's Sheyenne Care Center confirmed one case of scabies. City-County Health Officer said proper procedure was followed. No other cases have been found. (Source: Valley City Times-Record)

February 1, 2012 No confirmed cases of influenza in Barnes County to date in this flu season. (Source: Valley City Times-Record)

August 27, 2012 Two cases of West Nile confirmed in Barnes County in the past two weeks. Also in Barnes County, the director of disease control division on NDDOH said one case of "asymptomatic blood donor - it's related to West Nile." (Source: Valley City Times-Record)

January 11, 2013 to January 13, 2013 As of 1/10/13, there have been four reported cases of influenza in Barnes County. (Source: Valley City Times-Record)

Hazard Mitigation Articles

October 1, 2009 Article on flu vaccine. (Source: Valley City Times-Record)

August 11, 2011 Article on updating immunizations before school starts.

October 13, 2011 County-wide push to get flu shots. Flu clinics in schools and communities. (Source: Valley City Times-Record)

December 7, 2011 Article on Dec. 4-10 being National Influenza Vaccination Week. (Source: Valley City Times-Record)

April 4, 2012 Letters going out to property owners to remove dead trees and stumps to stop the spread of disease. (Source: Valley City Times-Record)

April 25, 2012 Article on National Infant Immunization Week, April 21-28, 2012. (Source: Valley City Times-Record)

January 11, 2013 to January 13, 2013 Article on symptoms of influenza and the availability of flu shots. (Source: Valley City Times-Record)

May 28, 2013 Article on NDDOH warns people cleaning buildings that were closed for winter to protect themselves against hantavirus, a disease transmitted by infected mice. (Source: Valley City Times-Record)

July 30, 2013 Article on preventing tree disease, such as Dutch elm disease, by acting early to protect the trees. (Source: Valley City Times-Record)

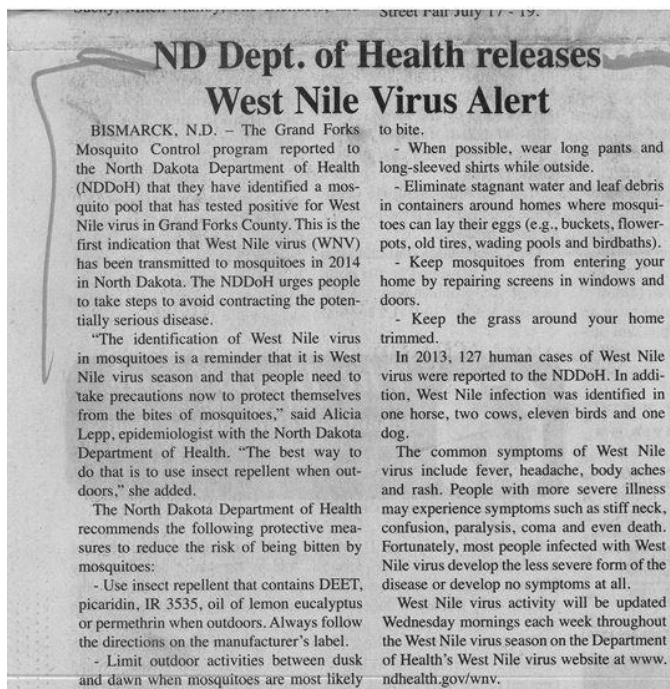
July 30, 2013 Article on Shingles vaccine. (Source: Valley City Times-Record)

August 26, 2013 Article on City-County Health District participation in National Immunization Month. (Source: Valley City Times-Record)

November 13, 2013 Feral cats are a rabies concern. If you are bitten or scratched by a feral cat, the ND Department of Health recommends a series of four shots over 14 days. (Source: Valley City Times-Record)

February 26, 2014 City-County Health Department immunizations given in 2013 were up significantly up from past years said a registered nurse of the public health immunization program and manager of school nursing. (Source: Valley City Times-Record)

July 17, 2014 The North Dakota Department of Health releases West Nile Virus alert



Source: Dickey County Leader

2010 Barnes County Multi-Hazard Mitigation Plan

The first North Dakota recorded death from West Nile Virus in 2006 occurred in Barnes County. In 2005 there was the presence of West Nile Virus infecting 25 humans, 79 birds, 53 sentinel chickens and 7 horses. Outbreaks had been localized and controlled.

5.2 Dam Failure

Characteristics

A dam is any artificial man-made barrier that impounds or diverts water or underground streams. According to the 2014 NDMHMP, the purpose of a dam includes: the storage of water for irrigation, hydro-electric power generation, flood control, water supply, recreation, and wildlife. If a dam should fail, impacts can range from minimal to complete devastation, depending on location and volume of water impounded. The North Dakota State Water Commission and the State Engineer have the power, authority and general jurisdiction to regulate and control activity related to dams. The State Water Commission administers the Dam Safety Program.

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard. The dam failure hazard is determined by the potential loss of life and downstream property damage it may cause, and not by any particulars of the dam itself.

There are many reasons and/or potential causes for dam failure such as terrorism, earthquakes, etc. However, according to the 2014 NDMHMP, the most common reasons are hydraulic inadequacy, seepage problems, and structural defects. Each is described below.

- **Hydraulic Failures** – Hydraulic failures result from the uncontrolled flow of water, over, around, and adjacent to the dam, the erosion action of the water on the dam and its foundation. Earthen dams are particularly susceptible to hydraulic failures since earthen material erodes at relatively low velocities. Hydraulic failures account for approximately 30 percent of all dam failures. A hydraulic failure may occur due to wave action, erosion, and excessive spillway erosion, and overtopping as a result of insufficient reservoir storage and insufficient spillway capacity.
- **Seepage Failure** – All dams do have some seepage. Seepage occurs through the structure and its foundation. Seepage, if uncontrolled, can erode material from the downstream slope or foundation and work backwards toward the upstream slope to form a “scour hole” which often leads to a complete failure of the structure. Seepage accounts for approximately 40 percent of all dam failures. Piping is a special seepage problem where soil particles are transported by a flow of water from one area to another. Soil particles are transported, the flow becomes larger and the soil particles move faster until a tunnel of flowing water is created.
- **Structural Failure** – Structural failures involve the rupture or movement of monolithic components of the dam and/or its foundation. This is a particularly important hazard on large earthen dams and on dams built of low strength material such as silts. Structural failure accounts for approximately 30 percent of all dam failures.

Generally speaking, these type of failures are interrelated and complex. For example, uncontrolled seepage may weaken the soil of an earthen dam and lead to an embankment failure. A structural failure may shorten the seepage path and lead to a “piping” failure. Surface erosion may lead to embankment failures.

Time itself can also have an impact on dam integrity. Such things as weathering, mechanical changes, and the influence of chemical agents can affect a dam in the following ways:

- Engineering properties of the foundation and materials composing the dam may change
- Chemical properties of the contents may change
- Concrete can gradually deteriorate and weaken from leaching and frost, and the amount of sulfate present in the surrounding soil
- Monolithic behavior is affected causing high stress concentrations and water pressure that has free access to the interior of the structure
- Freeze/thaw damage is accelerated by these cracks
- Metal components can corrode unless maintained
- Timber structures such as cribbing will eventually decay from the change of water content as well as infestation by insects or attack by other organisms

Few man-made facilities pose a greater potential for the loss of life and property than the failure of a dam. Pent-up waters suddenly unleashed can have catastrophic effects on life and property downstream. Homes, bridges, and roads can be demolished in minutes.

Dams are categorized according to the potential hazard for loss of life and property damage, should the dam suddenly fail. Existing development must be considered when categorizing a dam. The hazard category is based on potential hazard from failure and not on the selected design criteria or storage capacity.

Although it is recognized that loss of life is possible with any dam failure, the following categories of dams have been established for North Dakota:

- Low Hazard – Dams located in rural or agricultural areas where there is little possibility of future development. Failure of low hazard dams may result in damage to agricultural land, township and county roads, and farm buildings other than residences. No loss of life is expected if the dam fails.
- Medium Hazard – Dams located in predominantly 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 lives may be expected if the dam fails.
- High Hazard – Dams located upstream of developed and urban areas where failure may cause serious damage to homes, industrial and commercial building, and major public utilities. There is a potential for the loss of more than a few lives if the dam fails. Source: Dam Safety Performance Report for the State of North Dakota

Barnes County has 52 dams listed with State Water Commission. A complete list of dams in Barnes County is shown at the end of this chapter.

According to the 2014 NDMHMP, Baldhill Dam and Clausen Springs Dam are high hazard dams.

History

According to the Association of State Dam Safety Officials, USA Dam Failure, Dam Incidents, neither Barnes County nor the State of North Dakota have had any reported failures or incidents since 1901. However, Clausen Springs Dam experienced significant erosion in 2009 after heavy snowmelt caused floodwaters to pour over the earthen spillway caused the downstream city of Kathryn to be evacuated. Detailed hazard data is available under the Hazard Profile and History section at the end of this chapter.

There has been one emergency pertaining to dam failure in Barnes County but no declared disaster.

Probability and Magnitude

Hazard history was gathered from Barnes County Emergency Management, NOAA, NCDC, SHELDUS, Stanford University National Performance of Dams Program (NPDP), and the previous FEMA-approved Barnes County Mitigation Plan. According to these sources, no known instances of dam failure have been recorded in Barnes County and therefore, the probability of the hazard in Barnes County is zero percent. However, the significant erosion of Clausen Springs Dam in 2009 caused the downstream city of Kathryn to be evacuated. The probability is still difficult to calculate as the occurrences were maintenance issues and did not result in total failure of the dam. There is always some probability of the hazard occurring in the future.

The dam failure of the Baldhill Dam would directly primarily impact the city of Valley City. The magnitude would be minimal in terms of loss of life as warning times would allow for proper evacuation of people in the inundation area. However, property loss would be catastrophic as nearly the entire city of Valley City lies within the inundation area.

Risk Assessment

Table 5.2.1 shows the risk assessment as determined by individual jurisdictions and the Plan Update Committee for Dam Failure. The risk assessment methodology can be found in the beginning of Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in Table 5.2.1 represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 5.2.1 – Risk Assessment Summary Dam Failure Scored Chart

| Dam Failure | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|---------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 4 | 2 | 2 | 4 | 2 | 10 |
| Dazey | NA | NA | NA | NA | NA | NA |
| Fingal | NA | NA | NA | NA | NA | NA |
| Kathryn | 4 | 3 | 3 | 3 | 1 | 12 |
| Leal | NA | NA | NA | NA | NA | NA |
| Litchville | NA | NA | NA | NA | NA | NA |
| Nome | NA | NA | NA | NA | NA | NA |
| Oriska | NA | NA | NA | NA | NA | NA |
| Pillsbury | NA | NA | NA | NA | NA | NA |
| Rogers | NA | NA | NA | NA | NA | NA |
| Sanborn | NA | NA | NA | NA | NA | NA |
| Sibley | 4 | 2 | 2 | 3 | 1 | 10 |
| Valley City | 4 | 1 | 1 | 4 | 2 | 8 |
| Wimbledon | NA | NA | NA | NA | NA | NA |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|------------------------|
| Seasonal Pattern | None |
| Duration | 24 hours |
| Speed of Onset | 12 to 16 hours warning |

According to the 2014 NDMHMP, Barnes County's has five medium hazard dams and two high hazard dams. The dam failure risk is moderate-high. Figure 5.2.2 at the end of this chapter shows the medium hazard dams and high hazard dams in Barnes County in relation to the state.

Capabilities of and Vulnerabilities to Jurisdictions

Upon review of the statistics and oral history of residents, Barnes County and the jurisdictions of Kathryn, Sibley and Valley City were subject to impacts from dam failures. Dam failure did not pertain to the cities of Dazey, Fingal, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn and Wimbledon.

Capabilities and vulnerabilities of jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they

scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of 3,247 housing units in Valley City • Possible loss of life due to length of warning time • Displaced residents due to property loss could become homeless • Loss of recreational activities and summer time population • Loss of recreational activities • Destruction of potable water infrastructure • Reduction in drinking water supply • Loss of crops and cropland • Loss of bridges and roads in and around inundation areas • Homes and farmsteads would be lost • Possibly temporary homeless population due to lack of facilities to shelter large numbers of people |
| Frequency | 2 | <ul style="list-style-type: none"> • No dam failures have occurred • Clausen Springs erosion 2009 – evacuation of the city of Kathryn |
| Likelihood | 2 | <ul style="list-style-type: none"> • The maintenance and security at the Baldhill Dam and all other dams are good and the likelihood of a failure is low • Possible” terrorist” action could target the dam |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing or shelters to house displaced residents • More vulnerable: Hospital is in the flood inundation area and medical facilities would be out of commission • More vulnerable: All of Valley City Emergency Response and government facilities are located in the inundation area • More vulnerable: Lack of facilities to shelter potentially large temporary homeless population • More/Less vulnerable: Adequate window of warning |
| Capability | 2 | <ul style="list-style-type: none"> • U.S. Army Corps. of Engineers located in Valley City and monitors Baldhill dam closely • Emergency Action Plan in place for Baldhill Dam • National Guard |

Vulnerabilities of County-Owned Buildings and Property

Significant hazard dams have the potential to impact county-owned buildings and property. A summary of county-owned buildings and property in Barnes County is provided in Chapter 4, Profile and Inventory. There are 19 county-owned buildings in the city of Valley City valued at \$19,461,931 and two county-owned buildings in the city of Kathryn valued at \$72,188.

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities and infrastructure are vulnerable to dam failures similar to county-owned buildings and property. Facilities and infrastructure located in inundation areas are highly susceptible to impacts from flood waters resulting from dam failures. Infrastructure such roads and rail in the transportation network and power lines in the utility network are vulnerable with the potential to be completely washed out. Chapter 4, Profile and Inventory provides information on county and city owned property in Barnes County and Chapter 9 provides maps of the transportation network in Barnes County. Major transportation routes such as Interstate 94, major freight railroad lines, the Hi-Line Bridge, and numerous county roads are vulnerable to dam failure.

Vulnerabilities to New and Future Development

New and future development located in the cities of Kathryn Valley City, which are geographically located along the Clausen Springs and Baldhill Dam inundation areas, are at risk from dam failures, respectively.

Vulnerabilities for new and future development for the city of Valley City has the potential to be reduced or eliminated if prohibited inside areas of the city located in the river valley and permitted on surrounding hillsides. However, the city is almost entirely located in the inundation area. Valley City and Barnes County does not have any known laws to prohibit or mitigate new development in dam inundation areas, with the exception of prohibiting development in areas located in designated floodplains. Although flood waters resulting from dam failures tend to flow along the floodplain, they can often extend beyond the floodplain due to the size and volume involved. Development located outside of the floodplain can still be at risk to a dam failure.

The city of Sibley is located geographically on Lake Ashtabula, which is formed by Baldhill Dam. New and future development would not be at risk to destruction from a dam failure. However, the city's economy is heavily dependent on the recreation activity provided by Lake Ashtabula. A dam failure would ultimately lead to emptying of the lake and devastate the local economy.

Data Limitations and Other Key Documents

Another source of data and statistics from dam failures and incidents was the Stanford University National Performance of Dams Program (NPDP). The NPDP, however, has been replaced by the Significant Incident Reporting Database (SIR), which is located within the Department of Homeland Security. The limitation in data from SIR is that search and retrieval methods for extracting data and incident details is not available. Information provided in the State of North Dakota MHMP 2013 stated that according to NPDP, there were 22 dam incidents in North Dakota between 1970 and April 2013, of which 11 were classified as dam failures and the remainder were classified as dam incidents.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

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

An Emergency Action Plan (EAP) specifies actions dam owners should take to moderate or alleviate the problems at the dam. It contains procedures and information such as failure inundation maps to assist emergency management officials with early-warning notification and evacuation plans. As stated in the 2014 NDMHMP, according to the North Dakota Century Code, dams with a storage capacity greater than 1,000 acre-feet are required to have an EAP. An EAP is in place for the Baldhill Dam.

Hazard Profile and History

Barnes County has 52 dams listed with State Water Commission. A complete list of dams in Barnes County is shown in Table 5.2.2. History of dam failure incidents is shown after Table 5.2.2. According to the 2014 NDMHMP, Baldhill Dam and Clausen Springs Dam are high hazard dams. Figure 5.2.1 shows the dams with the largest max pool volumes. Figure 5.2.2 is from the 2014 NDMHMP and shows the medium hazard dams and high hazard dams in Barnes County in relation to the state.

Table 5.2.2 shows an inventory of dams located in Barnes County. Information was provided by the State Water Commission. Details regarding the name of dikes was not available.

Table 5.2.2 – Dams in Barnes County

| Dam Name | Basin | Purpose |
|--------------------------|----------------|-----------------|
| Wolsky Dam | Maple River | Recreation |
| Berg Dam | Sheyenne River | Livestock |
| Larson Dam | Sheyenne River | Fish & Wildlife |
| Kathryn Dam | Sheyenne River | Recreation |
| Clausen Springs Dam | Sheyenne River | Recreation |
| Dike | James River | Flood control |
| Dike | James River | Flood control |
| Stevens Dam | Sheyenne River | Recreation |
| Stevens Dam | Maple River | Livestock |
| Fairfield Dam | Sheyenne River | Fish & Wildlife |
| Nelson Brothers Dam | Sheyenne River | Livestock |
| Thoreson-Monson Dam | Sheyenne River | Recreation |
| Brown Dam | Sheyenne River | Recreation |
| Berckerley Dam | Sheyenne River | Livestock |
| Stoney Slough Pool 1 | Sheyenne River | Flood control |
| Stoney Slough Pool 3-4-5 | Sheyenne River | Flood control |
| Stoney Slough 2 | Sheyenne River | Flood control |
| Cuba Dam | Maple River | Recreation |
| Anderson Dam | Sheyenne River | Recreation |
| Dike | Sheyenne River | Fish & Wildlife |
| Kratz Dam | Sheyenne River | Recreation |
| Olson Dam | Sheyenne River | Recreation |
| Hansen Dam | Sheyenne River | Livestock |
| Olson Dam | Sheyenne River | Livestock |
| Schoenecker Dam | Maple River | Fish & Wildlife |

Source: State Water Commission

Table 5.2.2 – Dams in Barnes County - Continued

| Dam Name | Basin | Purpose |
|-----------------------|----------------|-----------------|
| Koldok Railroad Dam | Maple River | Fish & Wildlife |
| Triebold Dam | Maple River | Recreation |
| Anderson Dam 2 | Sheyenne River | Fish & Wildlife |
| Anderson Dam 1 | Sheyenne River | Fish & Wildlife |
| Hamilton Dam | Sheyenne River | Other |
| Dike | Sheyenne River | Flood control |
| Mckee Dam | Sheyenne River | Recreation |
| Valley City Mill Dam | Sheyenne River | Water Source |
| Valley City Park Dam | Sheyenne River | Recreation |
| Dike | Sheyenne River | Flood control |
| Blumer Dam | Sheyenne River | Other |
| Blumer Dam #3 | Sheyenne River | Livestock |
| Kehoe Dam | Sheyenne River | Fish & Wildlife |
| Komrosky Dam | Sheyenne River | Fish & Wildlife |
| Wendel Dam | Sheyenne River | Fish & Wildlife |
| Dike | Sheyenne River | Flood control |
| Dike | James River | Flood control |
| Dike | James River | Flood control |
| Schug Dam | Sheyenne River | Livestock |
| Schug Dam | Sheyenne River | Recreation |
| Hess Farms Dam | Sheyenne River | Fish & Wildlife |
| Dike | -- | Flood control |
| Heinze Dam | Sheyenne River | Recreation |
| Berger Dam | Sheyenne River | Recreation |
| Emery Dam | Sheyenne River | Livestock |
| Dazey Dam | Sheyenne River | Recreation |
| Fogderud & Haugen Dam | Sheyenne River | Recreation |

Source: State Water Commission

Dam Failure History

Barnes County has had one incidence of failure of the emergency spillway and severe erosion at the Clausen Springs Dam in 2009. Details regarding this incident is shown below. Actions taken to repair the Clausen Springs Dam is found after the incident detail. A newspaper article from the Valley City Times-Record in October, 2011, discusses repairs to the dam.

April, 2009 The Clausen Springs Dam was bombarded by flooding. Heavy snowmelt from more than 100 square miles of farmland draining into Spring Creek caused the dam to become overloaded with water. The rushing floodwaters poured over the dam into its earthen emergency spillway at a pressure so great it eroded the spillway several feet up its walls, causing severe damage. Downstream, Kathryn residents were evacuated for several days. The N.D. National Guard dropped 1,000-pound sandbags from a helicopter on the spillway to shore it up.

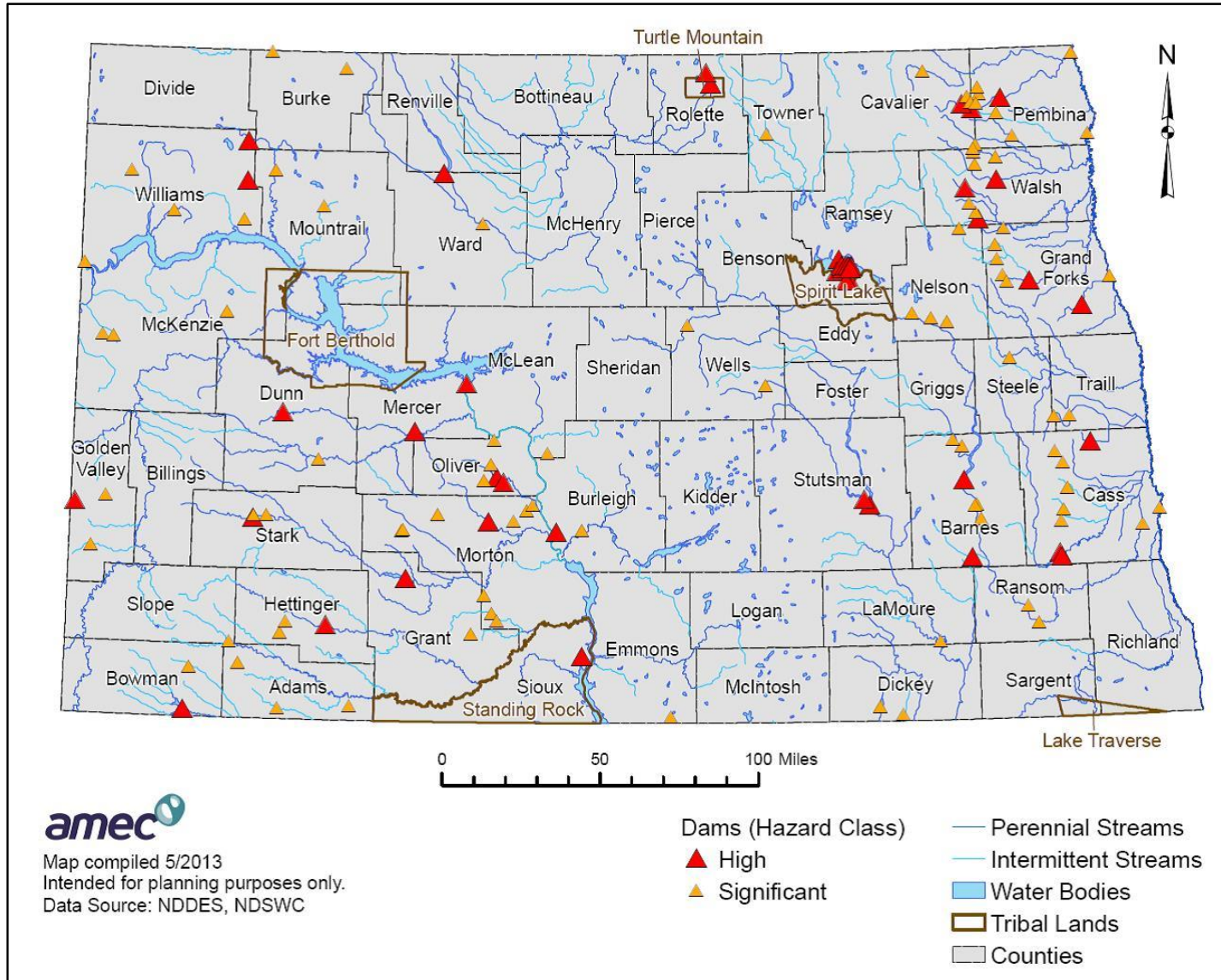
October 11, 2011 Repairs to the Clausen Springs Dam is wrapping up. (Source: Valley City Times-Record)

Figure 5.2.1 – Largest Max Pool Volume Dams – Barnes County



Source: 2010 Barnes County MHMP

Figure 5.2.2 – North Dakota High and Medium (Significant) Hazard Dams



Source: N.D. Department of Emergency Services

5.3 Drought

Characteristics

Definition: Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. Drought is a temporary diversion from normal climatic conditions and is different than aridity, which is a permanent feature of climate in regions where low precipitation is the norm, as in a desert. Drought characteristics usually include precipitation levels well below normal and temperatures higher than normal.

In addition to severe damage to vegetation, soil in a drought area becomes dry and crumbles. Often topsoil is blown away by hot, dry winds. Streams, ponds, and wells often dry up during a drought, thus wildlife and livestock suffer and even die.

Human factors, such as water demand and water management, can affect the impact that drought has on a region. Below are three commonly used definitions by the National Drought Mitigation Center

- Meteorological drought is defined based on the degree of dryness (in comparison to some “normal” or average) and the duration of the dry period. Drought onset generally occurs with a meteorological drought.
- 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 usually occurs following periods of extended precipitation shortfalls that impact water supply (examples: stream flow, reservoir and lake levels, ground water), potentially resulting in significant social impacts.
- Socioeconomic drought occurs when physical water shortage starts to affect people, individually and collectively. Or, drought associated with the supply and demand of an economic good.

Weather forecaster cannot predict just when a drought will occur. However, drought tends 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. It is a fact that precipitation deficits as little as four to six inches can cause severe drought conditions. Drought severity regarding agricultural procedures depends on the time of year, timing of precipitation, amount of stored soil water, type of crop, stage of growth, and meteorological variables such as temperature, humidity, and wind.

The U.S. is vulnerable to the social, economic, and environmental impacts of drought. The over 100-year weather record of the U.S. indicates that there were three to four major drought events. Two of these, the 1930s Dust Bowl drought and the 1950s drought, each lasted five to seven years and covered large areas of the continental United States.

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. The chemical quality of river and lake water will change, and sediment transport regimes of streams will be altered, because of reduction in flow.

Deterioration in water quality, in turn, results in injury and death to plants and animals. Stagnant pools along river courses will provide favorable habitats for insects, particularly mosquitoes and grasshoppers. Finally, with the return of rain, the dry and unstable top soil is vulnerable to gullying and flooding.

Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area experiencing physical drought. The complexity exists because water is integral to our ability to produce goods and provide services.

Impacts are commonly referred to as direct or indirect. A few examples of direct impacts are reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat. The consequences of direct impacts can result in indirect impacts. For example, a reduction in crop, rangeland, and forest productivity may result in reduced income for farmers and agribusiness, increased prices for food and timber, unemployment, reduced tax revenues, increased crime, foreclosures on bank loans to farmers and businesses, mitigation, and disaster relief programs. In fact, the web of impacts becomes so diffuse that it's very difficult to determine financial estimates of damages.

The U.S. Department of Agriculture frequently declares agricultural disasters because of drought as noted in the history section. In Barnes County the impacts would first be felt from agricultural losses as the counties economy relies on agricultural.

History

Information provided by the Spatial Hazard Events and Losses Database for the United States (SHELDUS) indicates one period of drought in 1988 for Barnes County. Information gathered from committee and jurisdiction meetings have indicated that while dryer periods have come and gone, the one true drought was in 1988. The 1988 drought was so severe that nearly all aspects of local economies were affected. Table 5.3.1 summarizes the history of drought in Barnes County.

Table 5.3.1 – Barnes County Drought Hazard History Summary

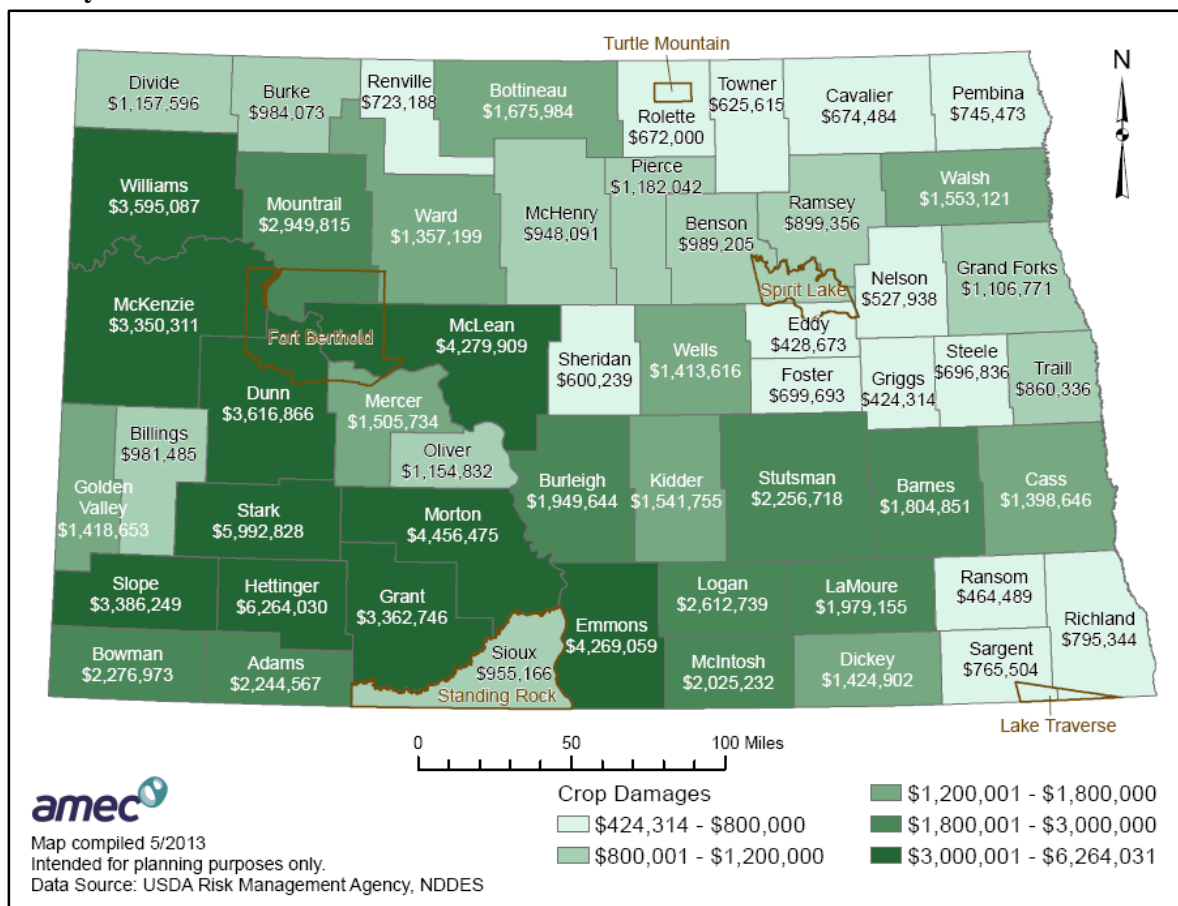
| Begin Date | Injuries | Fatalities | Property Damage | Crop Damage | Remarks | Source |
|--------------|----------|------------|-----------------|-----------------|--|------------|
| 6/1/1988 | 0 | 0 | \$94,340 | \$94,340 | Drought - Heat | SHELDUS |
| 8/4/2001 | 0 | 0 | \$0 | \$0 | Head of 115 to 125 degrees. | NCDC |
| 8/6/2006 | 0 | 0 | \$0 | \$0 | Barnes County received a D2 designation. | NCDC |
| 7/10/2012 | 0 | 0 | \$0 | \$0 | Lack of precipitation | NOAA, NCDC |
| 8/1/2012 | 0 | 0 | \$0 | \$0 | Lack of precipitation | NOAA, NCDC |
| 8/1/2012 | 0 | 0 | \$0 | \$0 | Dry conditions | NOAA, NCDC |
| 10/1/2012 | 0 | 0 | \$0 | \$0 | Dry conditions | NOAA, NCDC |
| Total | 0 | 0 | \$94,340 | \$94,340 | | |

Sources: Information Service/National Climatic Data Center (NCDC)
 National Oceanic and Atmospheric Administration (NOAA)
 Spatial Hazard Events and Losses Database for the United States (SHELDUS)

Crop loss from drought is tracked by the United States Department of Agriculture Risk Management Agency (RMA). The RMA provides data on the crop type affected, net claimed acres, indemnity, loss liability, loss cost and the number of policies covered. The net claimed acres is the total acres planted for crops in the county for the given year. Liability is the total value in crops planted in the county for the given year. Indemnity is the amount paid to cover insurance claims from crop loss due to drought. The total loss liability of crops was \$136,020,200 in Barnes County between 1990 and 2013 on 457,995 acres. Indemnity paid was \$38,680,556 resulting in losses of 28 percent of total liability. Crop loss indemnity paid from drought over the 24-year period resulted in an annual average of \$1,611,690.

Figure 5.3.1 shows the annualized estimated crop losses experienced in Barnes County from drought between 2003 and 2012 from the 2014 NDMHMP. Barnes County experienced an estimated \$1,804,851 in annual crop losses from drought, roughly \$193,000 less than data provided by the RMA. Although only one true drought event has been recorded, dry conditions persist from year to year and impact all types of crops to a varying degree. Detailed hazard data is available under the Hazard Profile and History section at the end of this chapter.

Figure 5.3.1 – 2003 to 2012 Annualized Estimated Crop Losses from Drought by North Dakota County



Source: North Dakota Department of Emergency Services

Barnes County has not had any Disaster Declarations for drought. North Dakota had three requests that were turned down. Table 5.3.2 summarizes this information. Categories of potential drought losses are shown in the Hazard Profile and History section and provide information on understanding the various types of drought, related causes and types of loss expected. This data helps in determining why losses from drought have occurred in Barnes County in years in addition to the official drought in 1988. Detailed hazard data is available under the Hazard Profile and History section at the end of this chapter.

There have been no Presidential Disaster Declarations pertaining to drought in Barnes County.

Table 5.3.2 shows turned down requests for disaster declarations pertaining to drought in Barnes County.

Table 5.3.2 – Turned Down State Requested Presidential Disaster Declarations for North Dakota

| Requested Number | Turn Down Date | Type | Disaster Description | President |
|------------------|----------------|-----------|----------------------|-----------|
| 61005 | 08/31/1961 | Major | Drought | Kennedy |
| 80045 | 06/16/1980 | Emergency | Drought | Carter |
| 88022 | 11/18/1988 | Major | Drought | Reagan |

Source: <http://maggie6.cadsr.udel.edu/website/presdec/viewer.htm>, FEMA

Probability and Magnitude

Hazard history was gathered from the SHELDUS, NCDC, NOAA, and information from the 2010 Barnes County MHMP, which showed seven occurrences of drought between 1988 and 2012. The drought of 1988 was the only drought of magnitude to impact the county. Due to one instance of an official drought declaration, the probability of drought is very low in Barnes County. However, dry weather persists year to year and varies in intensity. Due to the local economy of small incorporated cities in the county being heavily reliant on the agriculture industry, the probability and magnitude of drought can be measured by crop loss. As shown from data provided by the 2014 NDMHMP and the RMA, crop losses from drought in Barnes County averaged between \$1,611,690 and \$1,804,851 annually. Approximately 80 claims of indemnity were made from crop loss due to drought between 1990 and 2013. Therefore, the probability of crop loss from drought is 100 percent and magnitude depends on the weather conditions in the immediate area. Figure 5.3.2 shows the areas subject to drought in Barnes County.

The magnitude of drought can also be measured by employment. According to Quarterly Census of Employment and Wages data from the N.D. Workforce Intelligence Network, in 2013 there are 20 agriculture, forestry, fishing and hunting establishments in Barnes County with an average employment of 65 people and total wages of \$2,471,470. In addition, many wholesale trade companies such as farm equipment dealerships and agriculture supply companies are connected to the agriculture industry and would be impacted. In Barnes County, there are 38 wholesale trade establishments employing an average of 324 people with total wages of \$16,316,436. The magnitude of a severe drought on the local economy would be catastrophic to jobs in the agriculture and agriculture-related industries in the county.

Risk Assessment

Table 5.3.3 shows the risk assessment as determined by individual jurisdictions and the planning committee for drought. The risk assessment methodology can be found in the beginning of Chapter 5, Threat and Hazard Identification Risk Assessment. The total in Table 5.3.3 represents the sum of each jurisdiction’s impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction’s capabilities to respond to the hazard.

Table 5.3.3 – Risk Assessment Summary Drought Scored Chart

| Drought | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|----------------|---------------|------------------|-------------------|----------------------|---------------------|--------------|
| Barnes County | 3 | 2 | 2 | 3 | 2 | 8 |
| Dazey | 4 | 2 | 2 | 3 | 2 | 9 |
| Fingal | 4 | 3 | 3 | 3 | 1 | 12 |
| Kathryn | 3 | 3 | 3 | 3 | 2 | 10 |
| Leal | 2 | 2 | 1 | 1 | 3 | 3 |
| Litchville | 3 | 2 | 2 | 2 | 3 | 6 |
| Nome | 2 | 1 | 1 | 4 | 1 | 7 |
| Oriska | 4 | 2 | 3 | 2 | 2 | 9 |
| Pillsbury | 2 | 2 | 3 | 2 | 2 | 7 |
| Rogers | 4 | 2 | 2 | 3 | 1 | 10 |
| Sanborn | 4 | 1 | 2 | 2 | 1 | 8 |
| Sibley | 2 | 2 | 2 | 2 | 1 | 7 |
| Valley City | 1 | 2 | 2 | 2 | 3 | 4 |
| Wimbledon | 4 | 3 | 3 | 4 | 2 | 12 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|--|
| Seasonal Pattern | Starts with limited Snowfall/Summer |
| Duration | 1 to 5 years, up to a decade in severe cases |
| Speed of Onset | Slow and gradual |

Capabilities of and Vulnerabilities to Jurisdictions

Upon review of the statistics from SHELDUS and the 2014 NDMHMP, the frequency and likelihood of drought in Barnes County was scored low. However, impact across most jurisdictions was scored high due to local economics relying on the agriculture industry.

Capabilities and vulnerabilities of jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at

hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Hazard scoring notes and other information gathered at jurisdictional meetings pertaining to each jurisdiction can be found in Chapter 8, Jurisdictions.

Barnes County

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs, casualties (possible) • Loss of economy and jobs as the county is agriculturally based • Shortages of water may occur • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Impacts local food supplies • \$94,000 in property damage in 1988 • Total crop loss of \$38,680,556 in between 1990 and 2013 • Increase of insects which can further crop damage |
| Frequency | 2 | <ul style="list-style-type: none"> • Only one occurrence of severe drought occurred in 1988 • County received D2 drought designation in 2006 • In 2013, June to October experienced little to no rain • Dry conditions summer of 2014 • Indemnity covering crop loss has averaged approximately \$1,611,690 per year between 1990 and 2013 |
| Likelihood | 2 | <ul style="list-style-type: none"> • Low possibility as history shows only one occurrence of severe drought • Always a possibility given cyclical pattern of rain and weather • Not a lot of drain tile in county but could influence drought conditions |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Livestock and crops • More vulnerable: Lack of water sources for drought relief and for suppression of fires resulting from drought in some jurisdictions • More vulnerable: elderly and small children if water shortages did occur • More vulnerable: Length of a drought, which is difficult to predict, may increase vulnerability to the hazard • More vulnerable: Lack of aquifer to use as backup water source • More vulnerable: Unpredictable hazard due to speed of onset • Less vulnerable: Advanced warning systems such as reverse 911, cell phones, internet and TV • Less vulnerable: Burn bans implemented during dry periods |
| Capability | 2 | <ul style="list-style-type: none"> • Active county commission • Contracts for engineering, planning and grant writing • GIS services provided through state • County-wide mutual aid agreement • Maintains fire index signs at Litchville, Sanborn, Sibley and Valley City • Active emergency management department with education and outreach available on the departments website • Education and outreach provided by NDSU/Barnes County Extension Service |

Vulnerabilities to County-Owned Buildings and Property

Drought does not have an impact on structures in the county. However, loss of water supply would have an effect on the function of county-owned buildings. Disruptions in service and extended periods of closure may occur. Drought would threaten county-owned property from the increase in fire threat and the potential decreases in available water supplies for fire suppression.

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities that rely on water for operation and continued use are most susceptible to drought. Large employers in the agriculture sector and manufacturing can be negatively affected by drought and are viewed as critical facilities, depending on the number of people they employ and the impact they have on local economies. Critical infrastructure vulnerable to drought include public water systems that provide drinking water for the general public and disposal of waste water. Many public water systems extract water from surface bodies of water. If water levels become too low, public water systems may be forced to ration water or cease operation altogether. As a result, Barnes County and jurisdictions would have less access to water for fighting fires. A summary of county and city owned property in Barnes County is provided in Chapter 4, Profile and Inventory.

Vulnerabilities to New and Future Development

The greatest vulnerability from drought to new and future development would be underground water sources. New development has the potential to diminish underground sources with increases in population and economic activity. The N.D. Department of Health monitors public water systems. Individuals with wells and septic systems are not regulated. They would be more susceptible to drought.

The agriculture sector, with high crop prices and increasing yields, is becoming increasingly mechanized and requires larger amounts of water. Increased demand for water in the agriculture sector may increase vulnerability of drought in the county.

With the influx of energy development in the western portion of the State, large volumes of water are used in the hydraulic fracturing or “fracking” process for extraction of oil and natural gas. According to the 2014 NDMHMP, an average of three million gallons of water is required in the fracking process for each well drilled. With the announcement of test drilling in McIntosh and Emmons Counties, there is the potential for energy development to move to the eastern side of the State. Drought conditions could be exacerbated if energy development were to take hold in Barnes County.

Based on information in the 2014 NDMHMP obtained from the Drought Impact Reporter, the state can expect drought conditions affecting certain counties and regions to occur more frequently. With the possibility of climate change, this hazard may impact more regions of the State with more frequency.

Data Limitations and Other Key Documents

A data limitation for understanding impacts from drought is the difficulty in identifying the true extent of the drought in terms of time, or when a drought begins and when a drought ends. Characteristics of drought are hard to distinguish between periods of dryer than normal conditions and cyclical weather

patterns. Droughts tend to impact areas slowly and are not sudden like other hazards such as severe winter weather or flooding. In addition, impacts of drought are far reaching and tend to have a trickle-down effect on many sectors of the economy. Therefore, a process to determine near accurate loss estimates for drought is nearly impossible.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- North Dakota Drought Response Plan
- North Dakota Emergency Operations Plan
- Barnes County Emergency Operations Plan

Hazard Profile and History

Table 5.3.4 provides detailed information on crop loss from drought from the U.S. Department of Agriculture, Risk Management Agency. Table 5.3.5 shows detailed accounts of drought incidents from NCDC and NOAA. Detailed accounts of drought included in the 2010 Barnes County MHMP from the NCDC, and newspaper history of drought events, are shown after Table 5.3.5. Figure 5.3.2 shows the areas subject to drought in Barnes County. Definitions of drought are provided below.

According to the 2014 NDMHMP, there are several scientific definitions of drought. Operational definitions are used to help quantify the beginning, end, and degree of severity of a drought. The following definitions were included in the state plan and 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.

Table 5.3.4 shows crop losses from drought. The following information was provided by the U.S. Department of Agriculture, Risk Management Agency documenting 80 incidents of indemnity paid for crop losses due to drought in Barnes County.

Table 5.3.4 – 1990 to 2013 Crop Losses from Drought in Barnes County

| Crop Year | Crop | Crop Type | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|-----------|------------|-------------------|---------|-------------------|-----------|----------------|-----------|--------------|
| 1990 | Corn | Grain | Drought | 3,116 | \$130,178 | \$208,176 | 63% | 68 |
| 1990 | Sunflowers | Oil | Drought | 980 | \$17,782 | \$62,134 | 29% | 12 |
| 1990 | Dry Beans | Dark Red Kidney | Drought | 757 | \$145,149 | \$156,804 | 93% | 8 |
| 1990 | Dry Beans | Pinto | Drought | 162 | \$14,470 | \$18,768 | 77% | 4 |
| 1990 | Dry Beans | Pea (Navy) | Drought | 680 | \$28,471 | \$90,162 | 32% | 11 |
| 1990 | Sunflowers | Confectionery | Drought | 302 | \$13,234 | \$22,453 | 59% | 6 |
| 1990 | Wheat | No Type Specified | Drought | 3,199 | \$90,834 | \$205,190 | 44% | 28 |
| 1990 | Barley | Spring Malting | Drought | 1,492 | \$28,459 | \$110,429 | 26% | 18 |
| 1990 | Soybeans | No Type Specified | Drought | 638 | \$18,435 | \$36,677 | 50% | 21 |
| 1990 | Barley | Spring | Drought | 270 | \$8,529 | \$15,178 | 56% | 5 |
| 1991 | Wheat | No Type Specified | Drought | 4,795 | \$111,112 | \$278,348 | 40% | 51 |
| 1991 | Soybeans | No Type Specified | Drought | 109 | \$3,495 | \$6,829 | 51% | 4 |
| 1991 | Corn | Grain | Drought | 688 | \$19,274 | \$43,879 | 44% | 15 |
| 1991 | Sunflowers | Oil | Drought | 823 | \$17,677 | \$61,662 | 29% | 15 |
| 1991 | Barley | Spring | Drought | 1,438 | \$35,046 | \$84,543 | 41% | 15 |
| 1991 | Barley | Spring Malting | Drought | 1,813 | \$47,434 | \$135,707 | 35% | 26 |
| 1992 | Corn | Grain | Drought | 258 | \$17,236 | \$17,641 | 98% | 6 |
| 1992 | Sunflowers | Oil | Drought | 504 | \$17,317 | \$35,600 | 49% | 12 |
| 1994 | Corn | Grain | Drought | 270 | \$8,036 | \$12,696 | 63% | 6 |
| 1994 | Sunflowers | No Type Specified | Drought | 1,528 | \$24,328 | \$34,863 | 70% | 13 |
| 1994 | Oats | No Type Specified | Drought | 353 | \$11,399 | \$16,590 | 69% | 10 |
| 1994 | Soybeans | No Type Specified | Drought | 289 | \$4,868 | \$9,763 | 50% | 6 |
| 1994 | Wheat | No Type Specified | Drought | 9,960 | \$242,870 | \$610,897 | 40% | 86 |
| 1994 | Barley | Spring | Drought | 1,056 | \$24,461 | \$51,395 | 48% | 30 |
| 1995 | Barley | Spring | Drought | 203 | \$4,646 | \$10,194 | 46% | 5 |
| 1995 | Wheat | No Type Specified | Drought | 373 | \$9,830 | \$16,975 | 58% | 7 |
| 1996 | Sunflowers | Oil | Drought | 554 | \$14,876 | \$44,043 | 34% | 5 |
| 1997 | Sunflowers | Oil | Drought | 812 | \$17,525 | \$67,884 | 26% | 8 |
| 1997 | Corn | Grain | Drought | 769 | \$35,545 | \$63,215 | 56% | 9 |

Chapter 5

| Crop Year | Crop | Crop Type | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|-----------|------------|-------------------|---------|-------------------|-------------|----------------|-----------|--------------|
| 1997 | Oats | No Type Specified | Drought | 178 | \$8,328 | \$10,808 | 77% | 4 |
| 1997 | Wheat | No Type Specified | Drought | 13,983 | \$394,091 | \$1,173,126 | 34% | 88 |
| 1997 | Barley | Spring | Drought | 932 | \$21,254 | \$64,470 | 33% | 19 |
| 1998 | Wheat | No Type Specified | Drought | 1,654 | \$51,253 | \$115,602 | 44% | 12 |
| 1998 | Soybeans | No Type Specified | Drought | 337 | \$16,901 | \$32,574 | 52% | 6 |
| 2000 | Wheat | Spring | Drought | 448 | \$23,940 | \$33,082 | 72% | 4 |
| 2002 | Corn | Grain | Drought | 368 | \$17,504 | \$41,420 | 42% | 9 |
| 2002 | Barley | Spring | Drought | 3,129 | \$87,111 | \$311,054 | 28% | 32 |
| 2002 | Wheat | Spring | Drought | 23,509 | \$796,947 | \$2,404,451 | 33% | 131 |
| 2002 | Sunflowers | Confectionery | Drought | 476 | \$34,902 | \$59,022 | 59% | 4 |
| 2002 | Sunflowers | Oil | Drought | 1,259 | \$48,832 | \$112,075 | 44% | 17 |
| 2002 | Oats | No Type Specified | Drought | 668 | \$15,890 | \$31,798 | 50% | 14 |
| 2002 | Soybeans | No Type Specified | Drought | 4,345 | \$186,786 | \$448,632 | 42% | 47 |
| 2003 | Barley | Spring | Drought | 448 | \$75,057 | \$156,702 | 48% | 12 |
| 2003 | Soybeans | No Type Specified | Drought | 20,926 | \$929,007 | \$3,105,804 | 30% | 109 |
| 2003 | Sunflowers | Oil | Drought | 576 | \$22,708 | \$70,519 | 32% | 15 |
| 2003 | Wheat | Spring | Drought | 816 | \$14,797 | \$64,909 | 23% | 7 |
| 2003 | Corn | Grain | Drought | 2,548 | \$221,631 | \$435,867 | 51% | 24 |
| 2004 | Soybeans | No Type Specified | Drought | 1,787 | \$43,184 | \$247,644 | 17% | 9 |
| 2006 | Corn | Grain | Drought | 14,725 | \$1,485,501 | \$3,228,201 | 46% | 107 |
| 2006 | Barley | Spring | Drought | 506 | \$27,040 | \$48,643 | 56% | 11 |
| 2006 | Dry Beans | Pea (Navy) | Drought | 458 | \$45,631 | \$73,581 | 62% | 4 |
| 2006 | Wheat | Spring | Drought | 1,652 | \$72,467 | \$187,248 | 39% | 24 |
| 2006 | Sunflowers | Oil | Drought | 215 | \$9,854 | \$23,547 | 42% | 9 |
| 2006 | Dry Beans | Pinto | Drought | 1,083 | \$122,728 | \$238,903 | 51% | 12 |
| 2006 | Soybeans | No Type Specified | Drought | 58,483 | \$2,603,815 | \$8,649,091 | 30% | 209 |
| 2007 | Barley | Spring | Drought | 95 | \$1,954 | \$13,776 | 14% | 4 |
| 2007 | Wheat | Spring | Drought | 1,088 | \$25,690 | \$159,951 | 16% | 14 |
| 2007 | Soybeans | No Type Specified | Drought | 223 | \$8,519 | \$31,523 | 27% | 6 |
| 2008 | Sunflowers | Confectionery | Drought | 399 | \$43,399 | \$140,792 | 31% | 4 |
| 2008 | Sunflowers | Oil | Drought | 312 | \$37,678 | \$89,551 | 42% | 5 |

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| Crop Year | Crop | Crop Type | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|--------------|-------------------|-------------------|---------|-------------------|---------------------|----------------------|------------|--------------|
| 2008 | Soybeans | No Type Specified | Drought | 51,999 | \$4,872,105 | \$16,764,730 | 29% | 152 |
| 2008 | Corn | Grain | Drought | 1,284 | \$200,266 | \$580,373 | 35% | 13 |
| 2009 | Soybeans | No Type Specified | Drought | 7,683 | \$500,659 | \$1,736,877 | 29% | 48 |
| 2009 | Wheat | Spring | Drought | 716 | \$47,735 | \$114,214 | 42% | 9 |
| 2009 | Corn | Silage | Drought | 103 | \$4,357 | \$25,382 | 17% | 4 |
| 2009 | Forage Production | Alfalfa | Drought | 267 | \$13,026 | \$30,324 | 43% | 4 |
| 2009 | Corn | Grain | Drought | 1,136 | \$108,990 | \$326,981 | 33% | 12 |
| 2012 | Wheat | Spring | Drought | 454 | \$11,450 | \$109,137 | 10% | 5 |
| 2012 | Forage Production | Grass Alfalfa Mix | Drought | 565 | \$22,864 | \$47,609 | 48% | 7 |
| 2012 | Dry Beans | Black | Drought | 435 | \$79,048 | \$243,769 | 32% | 4 |
| 2012 | Sunflowers | Oil | Drought | 298 | \$69,905 | \$91,225 | 77% | 6 |
| 2012 | Forage Production | Alfalfa | Drought | 233 | \$30,506 | \$41,703 | 73% | 4 |
| 2012 | Barley | Spring Malting | Drought | 1,182 | \$130,134 | \$383,503 | 34% | 12 |
| 2012 | Soybeans | Commodity | Drought | 21,364 | \$2,330,618 | \$8,092,466 | 29% | 91 |
| 2012 | Corn | Grain | Drought | 8,498 | \$1,952,571 | \$6,635,284 | 29% | 31 |
| 2013 | Sunflowers | Oil | Drought | 706 | \$117,242 | \$208,140 | 56% | 8 |
| 2013 | Soybeans | Commodity | Drought | 78,145 | \$6,092,091 | \$27,360,671 | 22% | 222 |
| 2013 | Corn | Grain | Drought | 84,359 | \$13,211,297 | \$48,069,827 | 27% | 233 |
| 2013 | Barley | Spring Malting | Drought | 759 | \$60,943 | \$172,352 | 35% | 7 |
| 2013 | Wheat | Spring | Drought | 1,993 | \$167,834 | \$652,572 | 26% | 13 |
| Total | | | | 457,995 | \$38,680,556 | \$136,020,200 | 28% | 2,367 |

Source: United States Department of Agriculture Risk Management Agency

Table 5.3.5 – 2012 Barnes County Drought Event History

| | |
|-----------------------------|---|
| Event | Drought |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/10/2012 05:00:00 CST-6 |
| End Date | 07/31/2012 23:59:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | |
| Episode Narrative | Lack of consistent precipitation across portions of eastern North Dakota led to a D2 drought designation per the U. S. Drought Monitor. Crops in the area began to suffer from the heat and lack of rainfall. |
| Event Narrative | |
| | |
| Event | Drought |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 08/01/2012 00:00:00 CST-6 |
| End Date | 08/31/2012 23:59:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Lack of consistent precipitation kept portions of eastern North Dakota in a D2 drought designation per the U. S. Drought Monitor. Despite several very warm days during the month of August, the average monthly temperature at both Fargo and Grand Forks was a little below normal. Precipitation remained spotty across the area, keeping precipitation totals below normal. The number of severe weather events for August also stayed quite low. |
| Event Narrative | |
| | |
| Event | Drought |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 09/01/2012 00:00:00 CST-6 |
| End Date | 09/30/2012 23:59:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

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| | |
|-----------------------------|---|
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Drought conditions worsened across eastern North Dakota through the month of September. At the Fargo and Grand Forks climate stations, only 0.12 and 0.21 inches of rain fell respectively, which was about 2 inches below the monthly normal. When the September 25 U. S. Drought Monitor came out, portions of Grand Forks, Nelson, Griggs, Steele, and Traill counties were upgraded to a D3 drought designation. |
| Event Narrative | |
| | |
| Event | Drought |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 10/01/2012 00:00:00 CST-6 |
| End Date | 10/31/2012 23:59:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Dry conditions remained over most of eastern North Dakota through early October, but then a welcome rain fell across a majority of the area from the 17th through the 19th. Rainfall amounts of one to two inches were common during this time frame. Most counties stayed in a D2 drought designation per the U. S. Drought Monitor, but portions of Grand Forks, Nelson, Griggs, Steele, and Traill counties did dip into the D3 range. |
| Event Narrative | |

2010 Barnes County MHMP

August 4, 2001, 1:00 PM CST – August 5, 2001, 4:00 PM CST

Heat indices topped out from 115 to 125, with temperatures in the 90s and dew points around 80. Several power outages occurred in Fargo due to overloaded circuits.

August 8, 2006, 6:00 AM CST – August 29, 2006, 6:00 AM CST

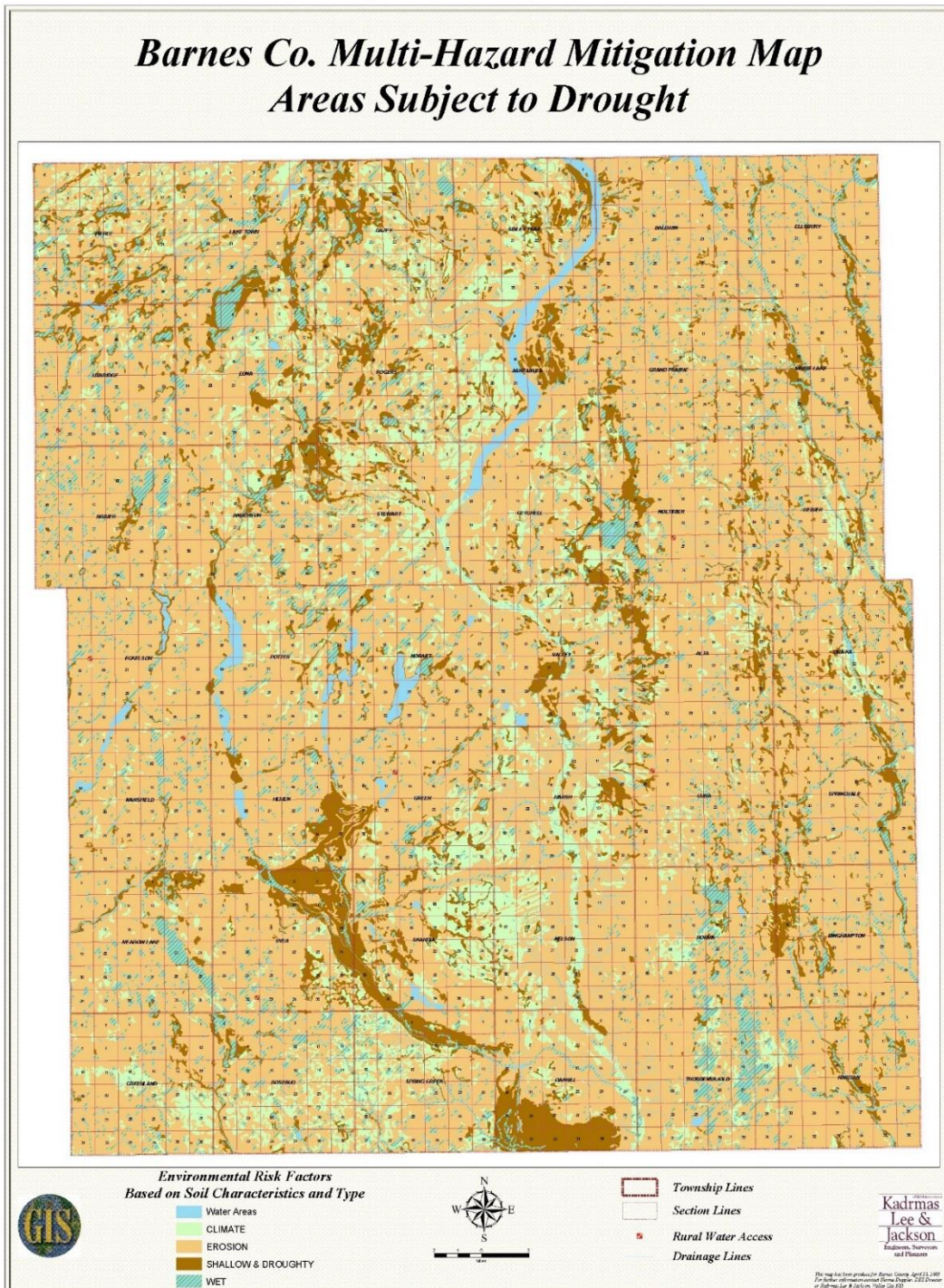
Benson, Eddy, Griggs, Cass, Barnes, Richland, Sargent, and Ransom counties all received a D2 drought designation on the 8th, and it was ended on the 29th of August, 2006.

Newspaper Articles

August 15, 2012 Gov. Jack Dalrymple has declared an agricultural drought emergency due to drought conditions in 50 counties in North Dakota. Barnes County is included. The U.S. Drought Monitor Index shows that 87 percent of North Dakota is experiencing drought conditions and portions of 20 counties are classified as suffering from severe drought. (Source: Valley City Times-Record)

October 29, 2012 Barnes County is one of the North Dakota counties eligible to apply for low-interest federal disaster loans from the U.S. Small Business Administration to offset economic losses caused by the drought that occurred July 10 through September 3, 2012. (Source: Valley City Times-Record)

Figure 5.3.2 – Areas Subject to Drought in Barnes County



Source: 2010 Barnes County MHMP

5.4 Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods

Characteristics

Flooding, as a natural hazard, has been a part of the county's conflict with nature throughout history and is defined as an overflow of water on land not normally covered by water. Floods are a natural phenomenon; however, flood hazards are often intensified by man because he interferes with or alters natural conditions.

Flood hazards arise from the complex effects of water on land surfaces and by water pressure. Flooding and its impact occur from the overflow of rivers, creeks, drainage channels, streams, lakes, and other bodies of standing water. Also, the inundation of low lands, the temporary backup of sewer and storm water systems, the rise of ground water, and finally the failure of flood control facilities such as dams, dikes, and levees.

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 snowpack which is affected by rapid warming trend as well as spring rain falling directly on the snowpack. 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 can also result from ice jamming or blocking streams. Ice breaking up into pieces, called floes, move along with the flowing rivers or streams. The ice floes can jam at curves, narrow places in the channel, and at structures creating an effective dam that produces water backup and overflow. Finally, flooding can occur as a result of dam, dike, or levee failure, overtopping or breaching.

Floods are classified as gradual or flash floods. A gradual flood is a slow developing event with a natural, predictable source of water or moisture, such as snow melt, slow rain, or a controlled dam release. This type can often be forecast from the amount of moisture or water available. Its time of occurrence can be calculated to a reasonable degree. Protective measures can usually be implemented in a timely manner to mitigate the potential damage and loss. The other type of flood is a quick-occurring, flash flood. A flash flood can happen in any jurisdiction in the county and is caused by: thunderstorms, heavy rains on snowpack, dam, dike or levee failures. This type of flood happens with little warning and response organizations have little time to react.

Overland flooding occurs when waterway quickly fill with rain water and jump their banks and cause flooding to surrounding areas.

Description of problem: High runoff produced by excessive rainfall and/or sudden spring thaws after periods of heavy snowfall will cause a river or other bodies of water to overflow and inundate areas, causing or threatening damage. The loss of life and severe damages may result when floodwaters strike cities, industries, and farms located in or near river valleys. Usually the damaged area is in a floodplain, which is a strip of relatively level land bordering a stream.

Floods can be classified in three categories:

- Category A – All major floods, exclusive of relatively localized floods, which extensive property damages occur or serious danger to life or flood protective work prevails.
- Category B – Floods, including so-called “flash floods”, as well as other relatively localized short duration floods, that produce high property damage or hazard to life in local areas without creating or contributing substantially to dangerous flooding along larger rivers downstream.
- Category C – Flows approaching flood stage in a relatively large drainage area without having directly caused loss of life or significant property damage, but creating a condition especially favorable to a major flood in the event of further heavy rainfall or snow melt or both.

History

Before settlers came to North Dakota, there were few flood damages. River and streams carved the valleys and the nomadic peoples who inhabited the territory moved to higher lands. Today, however, these valleys are populated with people and development needed to sustain those people has taken place.

Flooding of land adjoining the normal course of a stream or river has been a natural occurrence since the beginning of time. If these floodplain and floodway areas were left in their natural state, the floods would not cause any major damage. However, the economic attractiveness of the vacant land has resulted in the development of some floodplain areas despite the risk. The urban, industrial, and agricultural encroachment on natural floodplains areas has increased the potential for dangerous flooding and causes the flood waters to adversely affect land that formally was considered safe. The flood potential is increased because rainfall that used to soak into the ground or take several days to reach a stream/river via a natural drainage basin now quickly runs off streets, parking lots, rooftops, and through man-made channels and pipes.

The impact of flooding may be felt by the individual and family; city, county, state government; and within regions, such as an entire drainage basin.

A tremendous amount of soil erosion takes place throughout all river basins, drainage areas, streams, etc., by water movement and its pressure on land surfaces. Runoff from the eroded areas is swift, thus contributing to flood magnitude. Additionally, the eroded materials settle within runoff channels taking up space that previously was occupied by water during runoff periods. This sedimentation increases flood potential.

The spring flood danger occurs during March and April. 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.

Flood control development had its beginning with the Flood Control Act of 1936. This act provided a basic plan and authorized program for the control of water resources. In the early 1940s the North Dakota Water Commission cooperated with the Federal agencies to plan and engineer the overall program for North Dakota.

The U.S. Army Corps of Engineers occupies one of the major roles in flood control planning and construction. Two reservoirs built by the U.S. Soil Conservation Service have contributed materially to

flood control by the construction of watershed projects in North Dakota. These watershed projects include channel work and flood retention structures. In such projects, the Soil Conservation District has the responsibility for assuring that 50 percent of the farms above a structure are under a basic conservation plan.

Floodplain Management in North Dakota: North Dakota has recognized that good floodplain management involves the utilization of a variety of tools to reduce the impact of flood disasters. It is also recognized that a balance must be reached between the three aspects of floodplain management which are: structural works designed to modify the flood itself, regulatory functions and emergency preparedness actions which may reduce susceptibility to flooding, and emergency preparedness actions which minimize a flood’s effect during a disaster.

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. Participation in the NFIP requires communities to adopt floodplain regulations that meet NFIP objectives, which are: 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.

Communities have been provided assistance through passage, in 1981, of the state’s first Floodplain Management Act that directs the State Engineer to aid local government to reduce flood damages through floodplain management. As a start, the state legislature provided the State Engineer with an appropriation to be used in assisting communities to obtain base 100-year flood elevation data. With appropriate planning, we will see continued reduction in flood damage susceptibility across the state. It will likely take many years to achieve the established goals.

According to the N.D. Department of Emergency Services, there are 18 repetitive loss properties from flooding in Barnes County. Of the 18 repetitive loss properties, nine are located in Valley City, one is located in Kathryn, and the remainder are located rural areas of the county. One property in rural Barnes County was acquired in 2014 and is the process of closing.

Based on the data in Table 5.4.1, between 1948 and March 2014, Barnes County experienced 51 instances of significant flooding with three injuries and no fatalities. These events resulted in \$11,282,796 in property damage and \$1,865,000 in crop damage. Detailed hazard data is available under the Hazard Profile and History section at the end of this chapter.

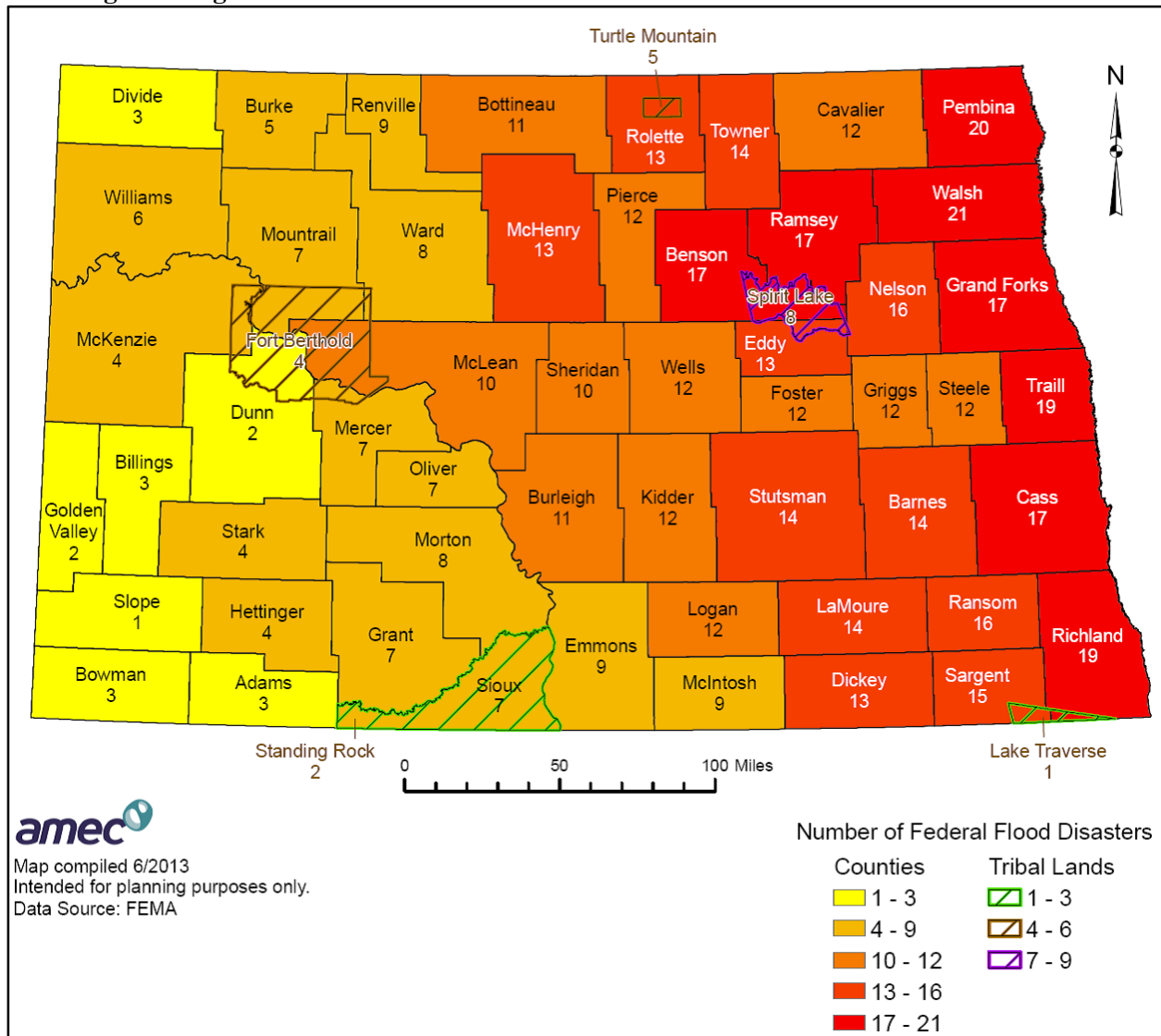
Table 5.4.1 – 1948 to March 2014 Barnes County Flood Event History Summary

| Flood | | | | | |
|-----------------------|-----------------|----------|------------|-----------------|-------------|
| Number of Occurrences | Date Range | Injuries | Fatalities | Property Damage | Crop Damage |
| 51 | 1948-March 2014 | 3 | 0 | \$11,282,796 | \$1,865,000 |

Sources: National Oceanic and Atmospheric Administration (NOAA)
 National Climatic Data Center (NCDC)
 Spatial Hazard Events and Losses Database for the United States (SHELDUS)
 Valley City Times-Record
 2010 Barnes County MHMP

Figure 5.4.1 shows the number of Presidential Disaster and Emergency Declarations that include flooding in Barnes County between 1989 and 2013. A total of 14 presidential disasters have been declared that impacted Barnes County.

Figure 5.4.1 – 1989 to 2013 – North Dakota Presidential Disaster and Emergency Declarations Including Flooding



Source: North Dakota Department of Emergency Services

Crop loss from flooding is tracked by the United States Department of Agriculture Risk Management Agency (RMA). The RMA provides data on the crop type affected, net claimed acres, indemnity, loss liability, loss cost and the number of policies covered. The net claimed acres is the total acres planted for crops in the county for the given year. Liability is the total value in crops planted in the county for the given year. Indemnity is the amount paid to cover insurance claims from crop loss due to flooding. The loss liability of crops was \$263,960 in Barnes County between 1990 and 2013 on 7,854 acres. Indemnity paid was \$541,071 resulting in losses of 49 percent of total liability. Crop loss indemnity paid from

flooding over the 24-year period resulted in an annual average of approximately \$11,000. Detailed data is available per crop for each year and can be found in the Hazard Profile and History section at the end of this chapter.

Probability and Magnitude

Based on hazard history information provided by NOAA, NCDC and SHELDUS, the probability of flooding events in Barnes County is 76 percent based on 51 events occurring between 1948 and March 2014. Crop losses data from flooding provided by the RMA over the 24-year period resulted in an annual average indemnity paid of \$11,000. The magnitude can be classified as substantial due to approximately \$11,000,000 in property damage. Damage from flooding commonly occurs to homes, roads, agricultural land and public infrastructure.

Risk Assessment

Table 5.4.2 shows the risk assessment as determined by individual jurisdictions and the committee. The total in this chart represents the sum of each jurisdiction’s impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction’s capabilities to respond to the hazard.

Table 5.4.2 – Risk Assessment Summary Flood Scored Chart

| Flood | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|---------------|---------------|------------------|-------------------|----------------------|---------------------|--------------|
| Barnes County | 4 | 3 | 3 | 4 | 2 | 12 |
| Dazey | 4 | 2 | 2 | 3 | 2 | 9 |
| Fingal | 3 | 3 | 3 | 4 | 1 | 12 |
| Kathryn | 3 | 2 | 3 | 3 | 2 | 9 |
| Leal | 4 | 2 | 3 | 3 | 2 | 10 |
| Litchville | 2 | 2 | 2 | 2 | 2 | 6 |
| Nome | 3 | 2 | 3 | 3 | 1 | 10 |
| Oriska | 3 | 3 | 4 | 4 | 2 | 12 |
| Pillsbury | 3 | 3 | 3 | 2 | 2 | 9 |
| Rogers | 3 | 3 | 4 | 3 | 1 | 12 |
| Sanborn | 4 | 3 | 3 | 2 | 1 | 11 |
| Sibley | 4 | 3 | 4 | 4 | 1 | 14 |
| Valley City | 4 | 4 | 4 | 4 | 1 | 15 |
| Wimbledon | 2 | 3 | 3 | 2 | 2 | 8 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|--|
| Seasonal Pattern | Spring snow melt off, Summer flash flooding, seasonal rain |
| Duration | 2 weeks |
| Speed of Onset | More than 24 hours warning |

Table 5.4.3 shows the communities participating in the National Flood Insurance Program. Communities that participate in the National Flood Insurance Program (NFIP) are required to adopt flood plain regulations that meet NFIP objectives:

- New buildings must be protected from flooding damages that occur as a result of the 100-year flood.
- New development must not cause an increase in flood damages to other property.

Table 5.4.3 – Jurisdictions Participating in National Flood Insurance Program

| Jurisdiction Name | CID # | Entry Date | Mapped |
|---------------------|--------|------------|---------|
| County of Barnes | 380339 | 06/04/87 | 2/06/08 |
| City of Kathryn | 380001 | 11/22/74 | 2/06/08 |
| City of Litchville | 380187 | 01/17/75 | 2/06/08 |
| City of Valley City | 380002 | 02/08/74 | 2/06/08 |
| City of Wimbledon | 380212 | 2/14/75 | NSFHA |

Source: FEMA Community Status Book Report, North Dakota

Capabilities of and Vulnerabilities to Jurisdictions

Upon review of statistics and data regarding flooding, the frequency and likelihood was ranked mostly a “3” or “4” in the county. Flooding is a concern for residents in the county given past losses and frequency of the hazard. The ranking for impact, vulnerabilities and capabilities for flooding varied between jurisdictions.

Capabilities and vulnerabilities of jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|---------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Roads can become washed out and limit access for emergency services and economy activity • Loss of economy resulting from crop damage Increased mosquitos-many transmit disease due to lots of grass and debris laying around • Large property loss, vehicles, personal property • Can impact lift stations and cause sewer backups • Damage to critical facilities and infrastructure • Potential loss of life from fast moving water and drowning’s • Some homes with basements which can become flooded • NFIP total paid as of 1/13/2013: \$2,297,190 |
|---------------|---|--|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Total crop loss of \$263,960 between 1990 and 2013 • Increased crime as emergency services are limited in mobility • Temporary relocation of medical services would decrease range of services offered • Temporary homeless population • Increase in communicable disease from overland flooding and standing water • Cause of secondary hazards such as shortage or outage of critical materials or infrastructure, or transportation accidents |
| Frequency | 3 | <ul style="list-style-type: none"> • Potential for overland flooding when experiencing heavy rain or a fast snow melt in the spring • Increase in strength of precipitation in recent years • Infrastructure improvements such as raising of roads still need to be completed • Per capita average annualized loss of \$400 • Annual indemnity of \$10,998 paid for crop loss |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy spring melting and heavy rains occurring every 5 years • Due to lack of storm water system overland flooding is likely in the future • High water table • Installation of drain tile • More paved or impervious surface increases runoff and decreases water absorbed naturally into the ground and increases magnitude of overland flooding • Changing weather patterns with increased rain intensity |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: Lack of storm water system in some jurisdictions • More vulnerable: High elderly population in certain areas • More vulnerable: Crops • More vulnerable: Aging population • More vulnerable: the size of the watershed and basin which drains water from Devils Lake area • Less vulnerable: County has been flood mapped • Less vulnerable: Road raises have been completed and properties have been removed from flood areas • Less vulnerable: Advanced warning systems such as reverse 911, cell phones, internet and TV • Less vulnerable: Local residents possess equipment for cleanup of debris |
| Capability | 2 | <ul style="list-style-type: none"> • FEMA Flood Mapped • Active County Commission • Contracts for engineering, planning and grant writing • GIS services are provided by the state and engineering firms • Relies on regional, state and other entities for assistance with major projects • Does not have financial resources to accomplish projects independently • Active emergency management department with education and outreach capabilities |

Vulnerabilities to County-Owned Buildings and Property

Vulnerabilities to county-owned buildings and properties from floods are always present whether flooding is due to flash flooding, overland, basement, riverine or closed basin. Locations of county-owned buildings will largely determine vulnerabilities to riverine and overland flooding. Basement flooding is mostly a site-specific issue occurring when mechanical systems fail or high precipitation causes water tables to rise. As shown in Chapter 4, Profile and Inventory of the county-owned facilities, 19 county-owned buildings are located in Valley City and are valued at \$19,461,931 consisting of approximately 97 percent of the total valuation of county-owned buildings. Figure 5.4.2 shows the vulnerability of the city Valley City to flooding. A majority of county-owned buildings in Valley City are located in the flood vulnerability and are at risk to the hazard. The flood vulnerability of Barnes County is shown in Figure 5.4.3.

Vulnerabilities of Critical Facilities and Infrastructure

Damage to critical infrastructure, mainly drinking water and sewer systems, roadways and electric power lines can occur when flooding of any kind occurs. Drinking water and sewer systems can be shut down as power to lift stations and water treatment facilities can be suspended. Roads can be washed out or blocked from overland flooding, which limits access to critical facilities such as emergency services and hospitals. An inventory of infrastructure, and county and city owned property in Barnes County is provided in Chapter 4, Profile and Inventory.

Vulnerabilities to New and Future Development

New and future development in Barnes County and Valley City are at high risk to flooding if allowed in a floodplain. With projected population increases in Barnes County through 2030, more people will be vulnerable to flooding if development is not restricted from flood prone areas. FEMA flood maps were produced for the county and jurisdictions in 2008 and are shown in Chapter 9, Maps figures 9.23 to 9.72. Mapping helps determine which areas are flood prone and not suitable for development. New and future development in Barnes County is less vulnerable to flooding than other counties without flood maps as local government can plan future growth accordingly.

Data Limitations and Other Key Documents

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- North Dakota Emergency Operations Plan, Flood Annex
- North Dakota Water Development Reports
- North Dakota NFIP Map Modernization Plan
- Barnes County Emergency Operations Plan

Hazard Profile and History

Table 5.4.4 provides details on crop loss from flooding. Tables 5.4.5 and 5.4.6 shows a detailed history of flash flood events and flood events in Barnes County between 2003 and 2013, respectively. Detailed accounts of flooding from the 2010 Barnes County MHMP are shown after Table 5.4.6. Figures 5.4.2 and 5.4.3 show the flood vulnerability of the City of Valley City and Barnes County, respectively. FEMA Flood Maps for Barnes County are located in Chapter 9, Maps.

Table 5.4.4 shows crop losses from flooding. The following information was provided by the U.S. Department of Agriculture Risk Management Agency documenting crop losses in Barnes County.

Table 5.4.4 – 1990 to 2013 Crop Losses from Flood in Barnes County

| Crop Year | Crop | Crop Type | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|--------------|------------|-------------------|---------|-------------------|------------------|------------------|------------|--------------|
| 1993 | Barley | Spring | Flood | 2,530 | \$77,103 | \$168,625 | 46% | 19 |
| 1993 | Sunflowers | No Type Specified | Flood | 1,663 | \$72,802 | \$127,361 | 57% | 22 |
| 1993 | Corn | Grain | Flood | 268 | \$17,327 | \$19,166 | 90% | 6 |
| 1993 | Barley | Spring Malting | Flood | 739 | \$30,660 | \$58,209 | 53% | 5 |
| 1993 | Wheat | No Type Specified | Flood | 2,653 | \$66,068 | \$167,710 | 39% | 20 |
| Total | | | | 7,854 | \$263,960 | \$541,071 | 49% | 72 |

Source: United States Department of Agriculture, Risk Management Agency

Table 5.4.5 shows a detailed history of flood events in Barnes County between 2003 and 2013 and was provided by the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Special Hazards Events and Losses Database for the United States (SHELDUS). The data is useful in understanding the specific details that occurred in flooding as each event includes descriptive narrative, helping identify common impacts and areas affected by the hazard.

Table 5.4.5 – 2003 to 2013 Barnes County Flash Flood Event History

| Event | Flash Flood |
|----------------|---------------------------|
| -- Flood Cause | Heavy Rain |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/24/2010 17:45:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NW |
| Begin Location | PILLSBURY |
| Begin Lat/Lon | 47.22/-97.81 |
| End Date | 05/24/2010 19:45:00 CST-6 |
| End Range | 2 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.22/-97.75 |

| | |
|-----------------------------|--|
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 2.00K |
| Crop Damage | 20.00K |
| Episode Narrative | After the first round of elevated convection from the early morning hours of the 24th drifted off to the northeast, a surface warm front was left along the North Dakota and South Dakota border by mid-morning. By midafternoon of the 24th, the warm front had pushed north to a Jamestown (ND) to Bemidji (MN) line. Behind this front, afternoon temperatures had increased to around 90 degrees with dew points in the mid to upper 60s. High perceptible water values remained over eastern North Dakota and the northwest quarter of Minnesota, keeping the heavy rain threat in place throughout the day. |
| Event Narrative | A quarter mile stretch of highway 32 was closed due to water over the road. Water was also reported to be running over Interstate 94 near the Cass County line. |
| | |
| Event | Flash Flood |
| -- Flood Cause | Heavy Rain |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 08/01/2011 08:00:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NW |
| Begin Location | PILLSBURY |
| Begin Lat/Lon | 47.22/-97.81 |
| End Date | 08/01/2011 10:00:00 CST-6 |
| End Range | 2 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.22/-97.75 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 25.00K |
| Crop Damage | 50.00K |
| Episode Narrative | This episode began late in the evening of July 31st and continued into the early morning hours of August 1st, as severe thunderstorms from central North Dakota moved into eastern North Dakota. Many of these storms showed a bow structure, or a structure indicative of strong winds. The storms were also slow movers and several rounds of them tracked over the same area. Hope, ND, was hit by both strong winds and very heavy rainfall. Damaging wind gusts were reported from Hope all the way through northern Richland County (ND). The storms crossed the Red River and produced more wind damage across northern Wilkin County (MN). |

| | |
|-----------------|---|
| Event Narrative | Several sections of farmland and farm access roads were flooded across Ellsbury Township. |
|-----------------|---|

Source: NOAA National Climatic Data Center, National Climatic Data Center

Table 5.4.6 – 2003 to 2013 Barnes County Flood Event History

| Event | Flood |
|-----------------------------|--|
| -- Flood Cause | Heavy Rain / Snow Melt |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 03/22/2009 11:15:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | NNW |
| Begin Location | FRAZIER |
| Begin Lat/Lon | 47.23/-98.44 |
| End Date | 03/31/2009 23:59:00 CST-6 |
| End Range | 3 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.23/-97.73 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 5.00K |
| Crop Damage | 0.00K |
| Episode Narrative | A stretch of warmer weather occurred from March 14th to 17th, which resulted in high temperatures in the 40s and low 50s. The snow depth in Fargo on the 14th was 15 inches with a melted water equivalent of 3.10 inches. By the 17th, the snow depth in Fargo had dropped to 6 inches. This was followed by a couple of cooler days, which temporarily slowed down any additional snowmelt. A second period of warmer weather began on March 20th and continued through the 24th. During this period of time, high temperatures again climbed into the 40s and low 50s. Most of the remaining snow in Fargo melted during this stretch of warm weather, with the Fargo snow depth falling from 2 inches to 0. Conditions were about the same in Grand Forks, with the snow depth falling to 0 by the 24th. These two warmups resulted in a quick response in river levels, especially across the southern Red River Valley and west central Minnesota. The mainstream Red River also showed a response, especially in the southern Red River Valley. With all the runoff moving into the river systems, water covered many roads and resulted in numerous road closures. The water covered entire sections of land as well and threatened many homes. A winter storm event on March 24th and 25th brought more snow to the region, along with a turn to colder temperatures. This resulted in a first crest for many rivers in the southern Red River Valley and west central Minnesota. However, river levels at most points along the mainstay Red River continued to stay high. Another winter storm event hit much of the area March 30th to 31st, dropping up to 2 feet of snow in the southern Red River Valley. There was a lot of moisture in this new snow, with snow to liquid ratios of less than 10 to 1. This set the stage for continued flooding into the months of April and early May. The North Dakota |

| | |
|-----------------------------|--|
| | Governor issued a statewide disaster declaration on March 13 in anticipation of spring flooding. Most counties in eastern North Dakota later received a Presidential Disaster Declaration. |
| Event Narrative | |
| Event | Flood |
| -- Flood Cause | Heavy Rain / Snow Melt |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 04/01/2009 00:00:00 CST-6 |
| Begin Range | 3 |
| Begin Azimuth | N |
| Begin Location | FRAZIER |
| Begin Lat/Lon | 47.23/-98.43 |
| End Date | 04/27/2009 14:00:00 CST-6 |
| End Range | 3 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.23/-97.74 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 5.00K |
| Crop Damage | 0.00K |
| Episode Narrative | This flood event began for many counties in late March, then continued through April and into May. After the winter storm event that dumped up to two feet of snow over portions of the region from March 29th through April 1st, temperatures remained below normal through the tenth of the month. Luckily, there were no other big rain or snow events through this time. However, being early April, the snowpack left on the ground did continue to melt. The remaining snowpack was deepest across the Devils Lake region, the far southern Red River Valley, and in the Sheyenne River Valley. The nearly two feet of new snow in the late March winter storm event caused additional overland flooding and river rises in the southern Red River Valley. The snowmelt in the Sheyenne River basin led to grave concerns from Lake Ashtabula on through Valley City, Lisbon, and areas along the river to its junction with the Red north of Fargo. To try to increase storage in Lake Ashtabula, releases were increased from Baldhill Dam, which dropped the lake level to 1260.50 feet MSL. Runoff into the lake then resulted in the lake level rising to 1269.50 feet MSL by late April. This gives a good perspective of how much water was moving overland and through the river system near the Sheyenne River. With the higher terrain this water moved through, many roads, bridges, and low points were washed out or covered with lakes of water. Water levels also remained high along the mainstream Red River. The rest of the month of April continued with below normal temperatures, while the climate reporting site at Fargo measured below normal precipitation amounts. |
| Event Narrative | |

| Event | Flood |
|-----------------------------|---|
| -- Flood Cause | Heavy Rain / Snow Melt |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 03/18/2010 10:48:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | NNW |
| Begin Location | FRAZIER |
| Begin Lat/Lon | 47.24/-98.45 |
| End Date | 03/29/2010 11:00:00 CST-6 |
| End Range | 4 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.24/-97.73 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | Several unusual factors combined to set off spring flooding in 2010. By early March, roughly 40 to 50 inches of snow had fallen across eastern North Dakota and the northwest quarter of Minnesota. From March 7th through 15th, the first order climate stations at Fargo and Grand Forks stayed almost entirely above 32 degrees. Also from March 4th through March 18th, daily average temperatures at the two stations were 6 to 14 degrees above normal. During the second week of March, a central plains storm system transported unusually high amounts of low level moisture into the area. As the storm system slowed, then stalled over Iowa from March 9th through the 12th, cloud cover persisted for 7 to 10 days and light rain bands wrapped back into the northern plains. Widespread light rain accumulations of 1.5 to 2.0 inches were common during this 4 day period. The snow was slower to melt over the central and northern Red River Valley, so areal flooding took longer to develop. Numerous roads were closed due to the flooding, including portions of Interstates 29 and 94. |
| Event Narrative | |
| | |
| Event | Flood |
| -- Flood Cause | Heavy Rain |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/25/2010 20:00:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NW |
| Begin Location | PILLSBURY |
| Begin Lat/Lon | 47.22/-97.81 |
| End Date | 05/28/2010 13:00:00 CST-6 |

| | |
|-----------------------------|---|
| End Range | 2 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.22/-97.75 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 5.00K |
| Crop Damage | 25.00K |
| Episode Narrative | After the first round of elevated convection from the early morning hours of the 24th drifted off to the northeast, a surface warm front was left along the North Dakota and South Dakota border by mid-morning. By midafternoon of the 24th, the warm front had pushed north to a Jamestown (ND) to Bemidji (MN) line. Behind this front, afternoon temperatures had increased to around 90 degrees with dew points in the mid to upper 60s. High perceptible water values remained over eastern North Dakota and the northwest quarter of Minnesota, keeping the heavy rain threat in place throughout the day. |
| Event Narrative | Water continued to flow over North Dakota highway 32 in multiple locations where local creeks contribute to the Maple River. |
| | |
| Event | Flood |
| -- Flood Cause | Heavy Rain / Snow Melt |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 04/03/2011 14:03:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | NNW |
| Begin Location | FRAZIER |
| Begin Lat/Lon | 47.24/-98.45 |
| End Date | 04/25/2011 10:59:00 CST-6 |
| End Range | 4 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.24/-97.72 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | The winter of 2010-2011 generally brought above normal amounts of snow to the area, but particularly so for the Devils Lake basin, the Sheyenne River basin, and the Wild Rice River basin. By April 1st, snow water equivalents were estimated to be about four to six inches in these areas with about two to four inches elsewhere. A see-saw pattern of temperatures led to a generally slow April snowmelt. At Fargo, |

| | |
|-----------------------------|--|
| | the first six days of April averaged near normal for temperatures. The next six days averaged above normal, which led to some snowmelt. From the 13th through the 23rd temperatures swung back below normal along with several days with additional snow. At Grand Forks, the temperatures ranged a bit different than at Fargo. The first 12 days of the month were above normal, then the 13th through the 22nd were below normal. The snow disappeared first in the northern Red River Valley, while it took longer to melt in the other areas. Overland flooding was particularly bad over Cass County. At the height of flooding, Interstate 29 was closed between Fargo and the Highway 200 exit, due to the high water. Traffic was diverted to state highway 18 for several days until the water receded. Hundreds of other roads were also closed due to overland flooding. |
| Event Narrative | |
| Event | Flood |
| -- Flood Cause | Heavy Rain |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 08/01/2011 09:59:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NW |
| Begin Location | PILLSBURY |
| Begin Lat/Lon | 47.22/-97.81 |
| End Date | 08/03/2011 09:58:00 CST-6 |
| End Range | 2 |
| End Azimuth | NE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.22/-97.75 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 10.00K |
| Crop Damage | 20.00K |
| Episode Narrative | This episode began late in the evening of July 31st and continued into the early morning hours of August 1st, as severe thunderstorms from central North Dakota moved into eastern North Dakota. Many of these storms showed a bow structure, or a structure indicative of strong winds. The storms were also slow movers and several rounds of them tracked over the same area. Hope, ND, was hit by both strong winds and very heavy rainfall. Damaging wind gusts were reported from Hope all the way through northern Richland County (ND). The storms crossed the Red River and produced more wind damage across northern Wilkin County (MN). |
| Event Narrative | Overland flooding continued near Pillsbury after three to six inches of rain fell. |

Source: NOAA National Climatic Data Center, National Climatic Data Center

The following narratives on flood events in Barnes County were provided by the 2010 Barnes County MHMP, which was obtained from the NCDC. Flood events from the NCDC, which are more specific to certain areas, include the following:

Summer 1948 Heavy rain near Kathryn caused the Sheyenne River to swell, backflow, and caused significant bottomland flooding south of Valley City.

Spring 1950 Baldhill Dam was closed. It was scheduled to take three years to fill. It filled in three weeks.

April 1965 Approximately 3.84 inches of precipitation fell in ten days causing flooding and significant releases from Baldhill Dam due to overfull conditions of the dam.

March 1966 A heavy snow fell for three days and melted within a week. Flooding was caused by rapid run off and ice jams. This affected southern Barnes County more than Valley City.

Spring 1969 Heavy snow with rapid ice melt caused riverine flooding. Valley City was strongly affected.

Spring 1979 Heavy snow with rapid ice melt caused riverine flooding. Valley City was strongly affected.

July 12, 1993 Seven to eight inches of rain fell in two hours overnight causing tremendous street flooding and basement flooding. Sewers backed up in Valley City as lift stations failed. The primary flood was caused by run off streaming from the hills. People canoed on Eighth Avenue that normally never floods. About 80 percent of the basements in Barnes County became working wells in addition to flooding through windows or doors. A second flood from northern run off was expected up to 22.5 feet at Valley City. Flood stage is 13 feet. Baldhill Dam “supercharged” to 1268 mfs, when normal pool is 1266 mfs. Officials diked and sandbagged, but the second flood topped out at 18 feet. The city of Fingal flooded, and there is no creek or river. A road had to be cut to let the water out of town. Many houses were flooded to the first floor level. The city of Litchville also flooded. Rural dikes failed.

March 1, 1995 Flooding occurred in much of central and eastern North Dakota. Record high temperatures led to rapid snowmelt. This in addition to saturated soil and above normal precipitation led to flooding in much of eastern and central North Dakota. Several homes were evacuated and many homes and businesses experienced water seepage. Also many city streets and county, state, and United States Highways were closed because of water over the roadway and due to washouts. Some residents had to use boats to get to and from their homes. In addition, water flooded thousands of acres of cropland, pasture, and residential property. One city had their drinking water contaminated and several had damage to their sewage lift stations. Rural Barnes County dikes failed. Valley City dikes held.

April 10, 1996 Moderate to severe flooding occurred on the Red River of the North and many of its tributaries in North Dakota. Above normal precipitation was observed over the basin for the 6 months prior to the flood. In addition, heavy snow cover, with drifts up to 12 feet, lingered into early April. This combined with a rapid snowmelt to produce a memorable spring flood, despite below average precipitation from mid-March through April.

June 2, 1997 Over 3 inches of rain fell in Barnes County, causing some basements to fill with 4 feet of water. The westbound lane of Interstate 94 was closed west of Valley City due to water across the roadway.

September 1, 1997 Heavy rainfall fell west of Valley City, closing the westbound lane of Interstate 94 at Hobart Lake. Prior to the closure, several cars stalled in the water. Property damage from this flash flood is estimated at \$3,000.

June 14, 1998 Over 4 inches of rain fell in less than two hours, causing major problems for the hilly terrain of Valley City. A thunderstorm remained nearly stationary, restricting problems just to the area immediately around the city. A few streets were submerged in water waist deep, covering vehicles and filling basements. Many streets were blocked off and some areas sustained sewer backup. Residents were asked to refrain from using water, to help the sewer system catch up. Property damage from this flash flood is estimated at \$250,000.

July 5, 2000, 2:00 AM CST – July 5, 2000, 2:00 AM CST

Crops were flattened by the heavy rain and several roads were under water 12 miles southwest of Valley City. Two and a half inches of rain fell in a short period of time.

April 1, 2001, 12:00 AM CST – April 15, 2001, 11:59 PM CST

Spring snowmelt and overland flooding led to numerous road closures, road and culvert washouts, and bridge closures around Barnes County. Three people were injured in Minnie Lake Township when a road collapsed beneath their car. Several basements were also flooded by the high water resulting in property damages of 500K.

April 7, 2001, 8:45 AM CST – April 7, 2001, 8:45 AM CST

One inch of rain fell around the Nome and Fingal areas, flooding some rural roads.

August 8, 2001, 9:25 PM CST – August 8, 2001, 9:35 PM CST

Street flooding was reported and several cars stalled in the high water in Valley City.

May 31, 2004, 10:35 AM CST – June 2, 2004, 3:00 PM CST

Convective rainfall over southeast North Dakota transitioned to a band of persistent wraparound rainfall from north of Devils Lake to southeast ND. The rain began in southeast ND on the 29th and continued into the day on the 31st. The rain over east central and northeast ND mainly occurred on the 30th and 31st, in the wraparound band of precipitation. However, rainfall totals were in the 3 to 6 inch range for the entire area. Many counties were already saturated from rains on March 27th, especially in the Devils Lake basin. Therefore, county-wide flood warnings were issued for these areas.

June 3, 2005, 6:30 PM CST – June 4, 2005, 4:00 AM CST

Four to 7 inches of rain fell in a four hour period. Three houses were flooded due to excessive runoff from the heavy rain. One house had main floor flooding while the other two had flooding in their garage and shop areas in Sibley. Gravel roads accessing the U. S. Army Corps of Engineers campgrounds southwest of Sibley were washed out. Water flowed across two county roads and cut them down to the culverts 13 miles north of Valley City.

June 7, 2007, 10:00 PM CST – June 9, 2007, 9:00 AM CST

Levees and ditches were built around Fingal to help keep overland flooding away from the town. Even so, about one-quarter of the towns 60 homes ended up with basement flooding. Several rural roads were also flooded by the heavy rain. Rainfall was persistent across southeast North Dakota throughout the month of May. The NWS Cooperative Observer at Baldhill Dam reported a May rainfall total of 5.19 inches. NDAWN mesonet sites near Dazey and Fingal reported May rainfall totals of 4.72 and 5.37 inches respectively. These values were close to 200 percent of normal. On June 6th and 7th, an area of surface low pressure tracked across extreme southeast North Dakota into north central Minnesota. This low pressure system was also nearly stacked (much like the flood event beginning on June 2nd), as the low pressure area at 500 MB tracked from northern South Dakota toward Winnipeg, Manitoba, Canada. Showers and thunderstorms pivoted around the low as it tracked to the east, bringing substantial rainfall amounts to portions of Barnes County. Rainfall totals from these two days amounted to 1.14 inches at Dazey and 2.71 inches at Fingal. This also gave Fingal a total of 4.38 inches for the first week of June.

June 17, 2007, 1:25 PM CST – June 18, 2007, 0:00 AM CST

An area of surface low pressure was located near Mobridge, South Dakota, early in the morning hours of the 17th. A warm front extended to the east from the low, into eastern South Dakota and southern Minnesota. As the low level jet intensified in the late evening, storms began to take shape south of Bismarck. These storms then expanded to the east along the Interstate 94 corridor toward the Fargo-Moorhead area. Hail was reported 1.25 inches 6 miles northwest of Hastings, and 1.00 inches 2 miles north of Fingal and 2 miles north, northwest of Kathryn. Flash flood waters covered State Highway 32 at numerous spots between markers 86 and 91, 6 miles south of Pillsbury. Flooding occurred 7 miles northwest of Valley City. Several rural roads were closed due to high water levels. There were 38 of 42 townships which reported damage to culverts, roadbeds, and driveways. Standing or flowing water through fields led to extreme crop stress and direct crop loss on about 5000 acres. Showers and thunderstorms moved into Barnes County shortly after midnight on the 17th and remained there until around sunrise. An estimated 2 to 4 inches of rain fell over portions of the county during this 6 hour time period. A NWS Cooperative Observer at Baldhill Dam reported 3.04 inches of rain and an NDAWN mesonet site near Dazey reported 2.46 inches of rain. Flooding also occurred across Barnes County earlier in June. Due to damages sustained during the two flood events, Barnes County received a Presidential Disaster Declaration. Property damage estimated at .5M and crop damage at 3M.

Late in the evening of the 17th, an area of surface low pressure was located just northeast of Jamestown, North Dakota, with a cold front extending south from the low. A warm front arched to the northeast, from near Jamestown to Grand Forks to Bemidji (MN). From the surface through the low layers of the atmosphere, wind speeds were quite strong. In the late afternoon of the 17th,

one lone thunderstorm cell developed over Polk County (MN). By early evening, another lone thunderstorm developed over Ramsey County (ND). Finally, just before midnight, a line of thunderstorms took shape over eastern North Dakota. This line of storms moved into northwest Minnesota around midnight. Very heavy rain accompanied .75 inch hail 3 miles south of Wimbledon. The thunderstorm contained winds to 60 kts 1 mile northwest of Litchville causing a large steel storage bin to tip over. Large trees were blown down in Valley City and fell on power lines causing power outages. Flash flood 4 miles west northwest of Dazey with ditches and fields under water and water covered a county road just north of State Highway 26.

March 22, 2009, 11:15 AM CST – March 31, 2009, 11:59 PM CST

A stretch of warmer weather occurred from March 14th to 17th, which resulted in high temperatures in the 40s and low 50s. The snow depth in Fargo on the 14th was 15 inches with a melted water equivalent of 3.10 inches. By the 17th, the snow depth in Fargo had dropped to 6 inches. This was followed by a couple of cooler days, which temporarily slowed down any additional snowmelt. A second period of warmer weather began on March 20th and continued through the 24th. During this period of time, high temperatures again climbed into the 40s and low 50s. Most of the remaining snow in Fargo melted during this stretch of warm weather, with the Fargo snow depth falling from 2 inches to 0. These two warm ups resulted in a quick response in river levels, especially across the southern Red River Valley and west central Minnesota. The main stem Red River also showed a response, especially in the southern Red River Valley. With all the runoff moving into the river systems, water covered many roads and resulted in numerous road closures. The water covered entire sections of land as well and threatened many homes. A winter storm event on March 24th and 25th brought more snow to the region, along with a turn to colder temperatures. This resulted in a first crest for many rivers in the southern Red River Valley and west central Minnesota. However, river levels at most points along the main stem Red River continued to stay high. Another winter storm event hit much of the area March 30th to 31st, dropping up to 2 feet of snow in the southern Red River Valley. There was a lot of moisture in this new snow, with snow to liquid ratios of less than 10 to 1. This set the stage for continued flooding into the months of April and early May. The North Dakota Governor issued a statewide disaster declaration on March 13 in anticipation of spring flooding. Most counties in eastern North Dakota later received a Presidential Disaster Declaration. Flooding in Barnes County began 4 miles north northwest of Frazier and extended 3 miles northeast of Pillsbury.

April 1, 2009, 00:00 AM CST – April 27, 2:00 PM CST

This flood event began for many counties in late March, and continued through April and into May. After the winter storm event that dumped up to two feet of snow over portions of the region from March 29th through April 1st, temperatures remained below normal through the tenth of the month. There were no other big rain or snow events through this time. However, being early April, the snowpack left on the ground did continue to melt. The remaining snowpack was deepest across the Devils Lake region, the far southern Red River Valley, and in the Sheyenne River Valley. The nearly two feet of new snow in the late March winter storm event caused additional overland flooding and river rises in the southern Red River Valley. The snowmelt in the Sheyenne River basin led to grave concerns from Lake Ashtabula on through Valley City, Lisbon, and areas along the river to its junction with the Red north of Fargo. To try to increase storage in Lake Ashtabula, releases were increased from Baldhill Dam, which dropped the lake

level to 1260.50 feet MSL. Runoff into the lake then resulted in the lake level rising to 1269.50 feet MSL by late April. This gives a good perspective of how much water was moving overland and through the river system near the Sheyenne River. With the higher terrain this water moved through, many roads, bridges, and low points were washed out or covered with lakes of water. Water levels also remained high along the main stem Red River. The rest of the month of April continued with below normal temperatures, while the climate reporting site at Fargo measured below normal precipitation amounts.

Newspaper Articles for Flooding Events

April 13, 2010 Rising Hobart Lake has swallowed up about 66 acres of productive field land and about nine acres of pastures land. It also flooded the Columbia Grain International elevator. (Source: Valley City Times-Record)

May 11, 2010 Barnes County was put on the Major Presidential Disaster Declaration list on April 30, 2010. (Source: Valley City Times-Record)

February 28, 2011 Flood forecast worsens for Valley City. Chance of major flooding up to 61 percent. Manager of the U.S. Army Corps of Engineers Baldhill Dam facility said they are draining the pool down to capture the melt and reduce flooding downstream. (Source: Valley City Times-Record)

March 28, 2011 Barnes County ranks ninth among North Dakota's 53 counties for most acres lost due to saturated land with 65,000 acres lost. (Source: Valley City Times-Record)

August 1, 2011 Wet weather of 2011 has prevented planting for many farmers in the area. The Farm Service Agency estimated that 110,000 acres were inundated with water in Barnes County during planting season, but has since raised that figure to 135,000 acres. (Source: Valley City Times-Record)

August 1, 2011 Several acres of a cornfield west of Eckelson lie underwater due to heavy snowmelt this spring and persistent rains. A statewide report on the total acreage lost this year is due out in August. (Source: Valley City Times-Record)

August 2, 2011 Lake Ashtabula Dam was discharging water at 4,200 cubic feet per second the morning of Tuesday, August 2nd, 2011. That is about 1,500 cfs more than the morning of Monday, August 1st, 2011. This is due to the 6 inches of rain that fell overnight Monday in Steele County, upstream of Valley City. (Source: Valley City Times-Record)

August 4, 2011 As a result of high rains in downstream communities, the state shut off the pumps at Devils Lake's west-end outlet on 8/1/11. This is a safety decision, because water is flowing too high and fast downstream in the Sheyenne River. (Source: Valley City Times-Record)

August 5, 2011 Sheyenne Rive has flooded over a couple no thru traffic signs at the entrance to City Park. (Source: Valley City Times-Record)

August 8, 2011 The Barnes County Commission and the City of Valley City declared a flood emergency on 8/3/11. Heavy rains over the weekend and on Monday falling north of Valley City have led to large

inflows into Lake Ashtabula, causing the Army Corps of Engineers to release more water from the Baldhill Dam, upstream from Valley City on the Sheyenne River. (Source: Valley City Times-Record)

September 2, 2011 Eckelson Lake is coming closer to swallowing County Road 22 east of Eckelson. Aerial photos show the road surrounded with water. (Source: Valley City Times-Record)

September 2, 2011 New outlet on Sanborn Lake has already taken about a foot of water off the lake. Plans for the outlet are to take a total of five to seven feet of water northeast to the Sheyenne River north of Valley City. The outlet has been granted a temporary permit from the State Water Commission. (Source: Valley City Times-Record)

September 13, 2011 After spring flooding 2009 and 2011 followed by this August's summer flooding a farm off Kathryn Road has been hit hard by erosion. The Sheyenne River is now within 30 feet of the cattle barn. (Source: Valley City Times-Record)

September 26, 2011 State Water Commission authorized spending money for a gravity-flow outlet from Stump Lake into the Tolna Coulee and onto the Sheyenne River. The gravity flow outlet will add 100 cfs to the current west-end outlet top flow of 250 cfs and the proposed 350 cfs flow from the east-end outlet now being built. When all three are fully operating the flow (from Devils Lake into the Sheyenne River) will be 700 cfs. (Source: Valley City Times-Record)

September 27, 2011 A project to install three 54-inch culverts to alleviate flooding along State Highway 1 is in the works. The county water board declared an emergency along a stretch of State Highway 1 south of Rogers. The declaration states "The flooding in the area is so substantial that Highway 1 is at risk of complete inundation, and spring runoff will most likely result in complete inundation, which could cause substantial transportation safety hazards...NDDOT would most likely have to close Highway 1, a safety measure that would limit emergency vehicle access to properties in the area and that would otherwise disrupt transportation and commerce in the region and the state." Funding source is the state department of transportation. As this is a state highway, concrete pipe will be used so it is a permanent fix. (Source: Valley City Times-Record)

November 17, 2011 State engineer and SWC engineer have told residents downstream of Devils Lake subject to increased flows to document any erosion on their properties for mitigation reimbursement. Erosion has affected county roads south of Valley City. Riverbank erosion can also affect bridges. The surveying will likely be a joint venture between Valley City and the county. Reimbursement funds from the State Water Commission will be looked into as a possible funding source. (Source: Valley City Times-Record)

October 11, 2011 Outlet funded by Burlington Northern Santa Fe railroad company reimbursement, because the high water was threatening its railroad tracks. Location at Sanborn Lake. (Source: Valley City Times-Record)

October 14, 2011 Hobart Lake, which runs from the south of Interstate 94 to the north side of County Road 22 west of Valley City has been growing in recent years threatening roads, railroads and farmland. It also threatens the grain elevators at Berea, on the west end of the airport road. An outlet will be built that would run from the lakes west side on County Road 22, past the grain elevators and into a channel

that drains through the extreme west end of Valley City and into the Sheyenne River near the Bjornson Golf Course. (Source: Valley City Times-Record)

December 20, 2011 Public Works crews work to move power lines from one side of the North Valley Bridge to the other to make way for a new bridge that will be built next year. Flooding earlier this year caused the bridge to be closed, creating a lengthy detour for residents trying to get out of north Valley City. (Source: Valley City Times-Record)

January 11, 2012 Ten Mile Lake in northwestern Barnes County is breaking out of its shell. The water board will seek to control the water with an outlet to keep it from threatening landowners and roads between Dazey, Wimbledon and Leal. Residents are pumping water out of their basements. Some roads in the area are still underwater. (Source: Valley City Times-Record)

March 14, 2012 Unseasonably warm temperatures, 58 degrees on 3/12/12 and 63 degrees on 3/13/12, have caused a near 2-foot rise in the Sheyenne River. The temps tied and topped the records highs for those dates respectively. (Source: Valley City Times-Record)

April 6, 2012 Flooding and subsequent deterioration have closed the east exit to the city of Sanborn. This along with long BSNF train delays at three of the other four city exits are causing problems for residents and concerns about emergency response times. (Source: Valley City Times-Record)

June 26, 2013 Valley City High School and Valley City State University both received significant damage in the 6/20/13 flash flood. Both institutions have filed insurance claims and are waiting to see if payment is received for damages. VCHS damages are estimated at \$60,000 with a possible \$100,000 more if the flood damaged the south gym floor. As of press time, there was no estimate of cost to the damage done at VCSU. (Source: Valley City Times-Record)

January 2, 2014 A massive summer flash flood on 6/20/13 left many Valley City businesses, homes and two schools damaged. The rain flooded the streets of Valley City, causing damages to businesses such as Iron Stallion, the Law Enforcement Center, Valley City State University and Valley City Junior High School. (Source: Valley City Times-Record)

March 19, 2014 A blocked culvert in a ditch along Main Street east of Valley City caused minor flooding. Water nearly reached the deck of the bridge and did reach the street before crews arrived to open the culvert. (Source: Valley City Times-Record)

Newspaper Articles from 2009 Flood

May 5, 2010 Sites damaged at the Barnes/Cass county line east and south of Fingal for \$18,066, and north of Fingal for \$17,679, in the 2009 flood will have a new culverts installed. (Source: Valley City Times-Record)

May 17, 2010 Damages to the streets of Valley City from the flood of 2009 are approximately \$910,000. 102 locations on residential roads require repair. Most will be funded by FEMA, 7 percent by the ND Department of Emergency Services and 3 percent from the city infrastructure fund. (Source: Valley City Times-Record)

August 8, 2010 According to the city administrator, Valley City's share of the flood repair work total is \$857,000. FEMA and the state of North Dakota have pledged \$6.5 million toward Valley City flood repair cost. The city expects to pay 3 percent as its local share which is \$197,000. In addition, nonqualified flood-related city costs include \$125,000 to repair sluice gates, \$35,000 as its share of National Guard expense and nearly \$500,000 for the sanitary sewer project. (Source: Valley City Times-Record)

February 23, 2011 Replace the bridge on Barnes County Highway 21 underneath the Hi-Line Bridge, often referred to as the North Valley Bridge. The approaches for the existing bridge went under water during the 2009 flood and the new bridge would be about two and a half feet higher than it is now. (Source: Valley City Times-Record)

March 28, 2011 The calving barn at Bar Lazy S Ranch south of Valley City flooded in 2009 spring flood and 14 calves were lost to flooding alone. (Source: Valley City Times-Record)

Newspaper Articles from 2011 Flood

April 6, 2011 Road between Kathryn and Nome was closed 4/4/11, with water blocking the road 1.5 miles east of Nome. (Source: Valley City Times-Record)

April 6, 2011 No travel advised, because of overland flooding in Binghampton Township. (Source: Valley City Times-Record)

April 6, 2011 County Road 38 has been closed, because of overland flooding. (Source: Valley City Times-Record)

April 6, 2011 Water washes away 36th St SE just east of ND Hwy 32 about eight miles north of Fingal on 4/5/11. No travel is advised near Fingal as Binghampton Township roads are being threatened by overland flooding. (Source: Valley City Times-Record)

April 7, 2011 Ice dams are forming in the Sheyenne River about 1.25 miles south of the Walker Dam, known to local residents as the Kathryn dam. The ice dam is at a bend in the river, not by a bridge or road, so there is nothing that can be done about this particular dam. It is backing up the water flow on the Sheyenne River. (Source: Valley City Times-Record)

April 11, 2011 Evacuation plan is in place for residents of Kathryn. On 4/8/11, the National Weather Service issued a flash flood watch for the Kathryn area, and early on 4/9/11 water was trickling over Clausen Dam's recently bandaged spillway. (Source: Valley City Times-Record)

April 11, 2011 U.S. Army Corps of Engineer predict the Sheyenne River to reach between 18.5 feet and 19 feet this week. It depends on the local inflows into the creek. A crest has not been forecast. The rain on 4/10/11 was light measuring around one-quarter of an inch. (Source: Valley City Times-Record)

April 12, 2011 First bridge on County Road 21 south of Valley City closed due to water. (Source: Valley City Times-Record)

April 12, 2011 The National Weather Service is predicting the Sheyenne River in Valley City will crest this evening somewhere between 18 and 19 feet, and that it will remain in that range through early next

week. All emergency levees have been built to 22.5 feet while existing levees are at 21 feet. (Source: Valley City Times-Record)

April 13, 2011 The warmer temperatures the weekend of 4/8/11 through 4/10/11, resulted in melting snow from the upper basin increasing the levels of the Sheyenne River. (Source: Valley City Times-Record)

April 13, 2011 North Valley Bridge closed due to water. (Source: Valley City Times-Record)

April 14, 2011 On 4/13/11, the Sheyenne River rose to 20.55 feet. Its second highest level in recorded history. (Source: Valley City Times-Record)

April 14, 2011 On 4/13/11, water seeped beneath the sand-filled HESCO barriers on Main Street. (Source: Valley City Times-Record)

April 14, 2011 The first bridge south of Valley City on the Kathryn Road was underwater on 4/13/11. (Source: Valley City Times-Record)

April 15, 2011 All bridges on the Kathryn Road, except for the third bridge south of Valley City, were closed the evening of 4/14/11 due too high water and flooding. (Source: Valley City Times-Record)

April 15, 2011 Riverside Garden Apartments in Valley City surrounded by a dike due to the flood waters. (Source: Valley City Times-Record)

April 18, 2011 Sheyenne River at 20.6 feet, the Army Corps of Engineers said that it plans to cut outflows of the Baldhill Dam from 7,100 cfs to 6,500 cfs. (Source: Valley City Times-Record)

April 18, 2011 Contingency levees went up in five areas in Valley City starting Saturday under the direction of the Army Corps of Engineers. According to the city news release, those areas are: the north end of Chautauqua Blvd, College St SW and 4th Ave SW near Valley City State University, 4th St SE west of mill dam, around one house on 8th Ave NE, behind Marketplace Foods and the historic Elks building. Three other acres will be blocked with levees in the street: Main Street near the Rosebud Visitor Center, Chautauqua Blvd between 8th and 12th streets NE and College St SE between 2nd and 3rd avenues SE. (Source: Valley City Times-Record)

April 18, 2011 City purchased 200,000 filled sandbags from Fargo at \$1.20 each. City auditor said the costs of the flood fight so far are between \$1 million and \$1.5 million, and the city direly needs a federal disaster declaration retroactively extended to February to pay for the flood. (Source: Valley City Times-Record)

April 20, 2011 Damage to county and township roads, along with costs incurred during the 2011 flood fight, is estimated at \$6.5 million. County recommended speed is 35 MPH. The extent of the damage won't be known until the water recedes. (Source: Valley City Times-Record)

April 20, 2011 The Tomahawk Dam chronically washes out the road above it. The washed out portion was 15 feet wide. The water had washed out the fill between the culverts. (Source: Valley City Times-Record)

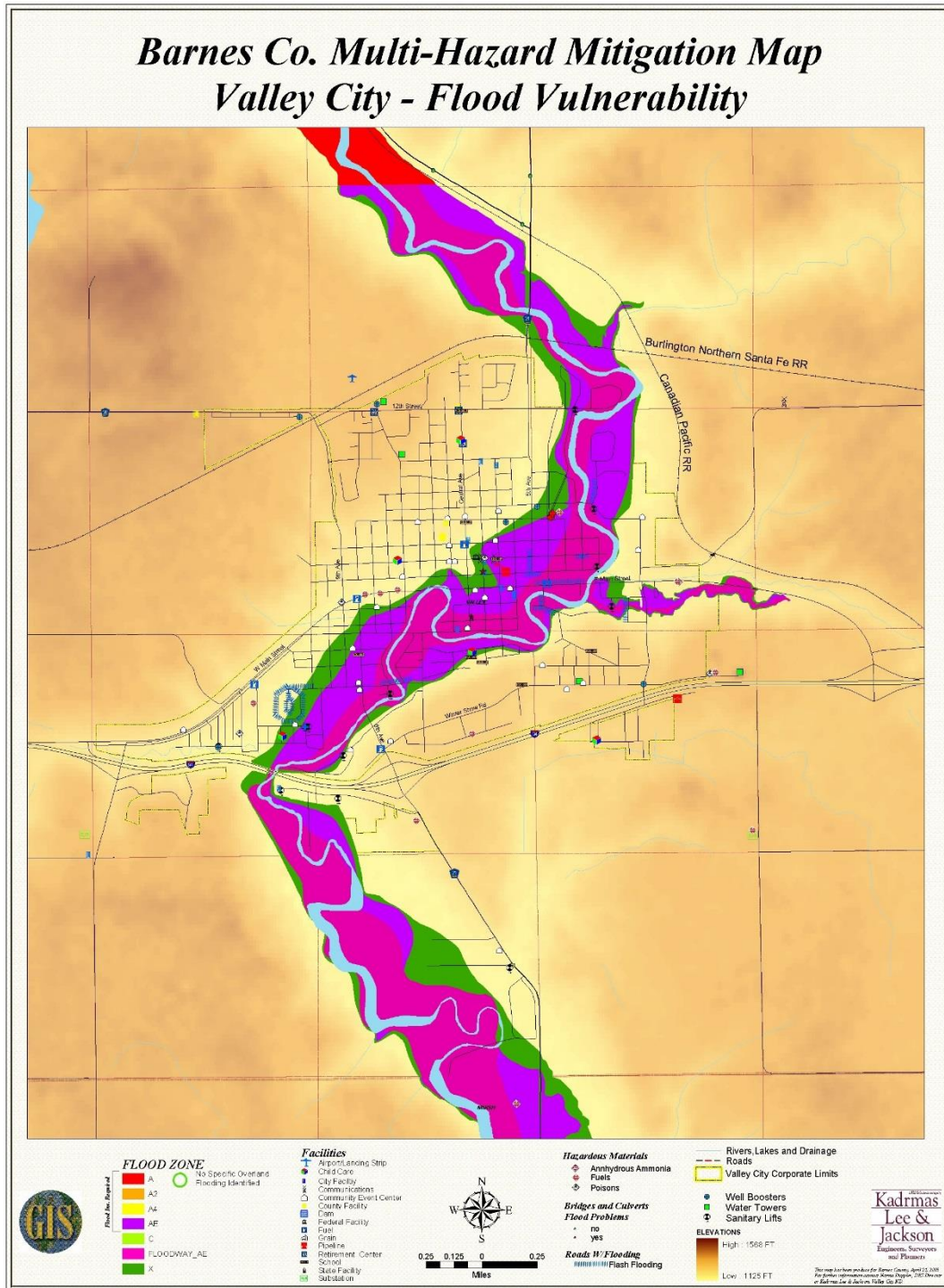
April 21, 2011 The floor of Dacotah Pavilion in Chautauqua Park is under water. There is water covering the stage of the City Park band shell and is the band shell's basement which was still being repaired from the 2009 flood. Water is covering five of the holes of the Bjornson Public Golf Course. (Source: Valley City Times-Record)

April 27, 2011 Lake Ashtabula on the Sheyenne River has reached record level. The Army Corps of Engineers say the reservoir began cresting at an elevation of 1,270.5 feet tying the record set in 2004. (Source: Valley City Times-Record)

April 28, 2011 Sheyenne River at 17 feet, established as major flood stage, for 17 days straight. This level will last for more days. (Source: Valley City Times-Record)

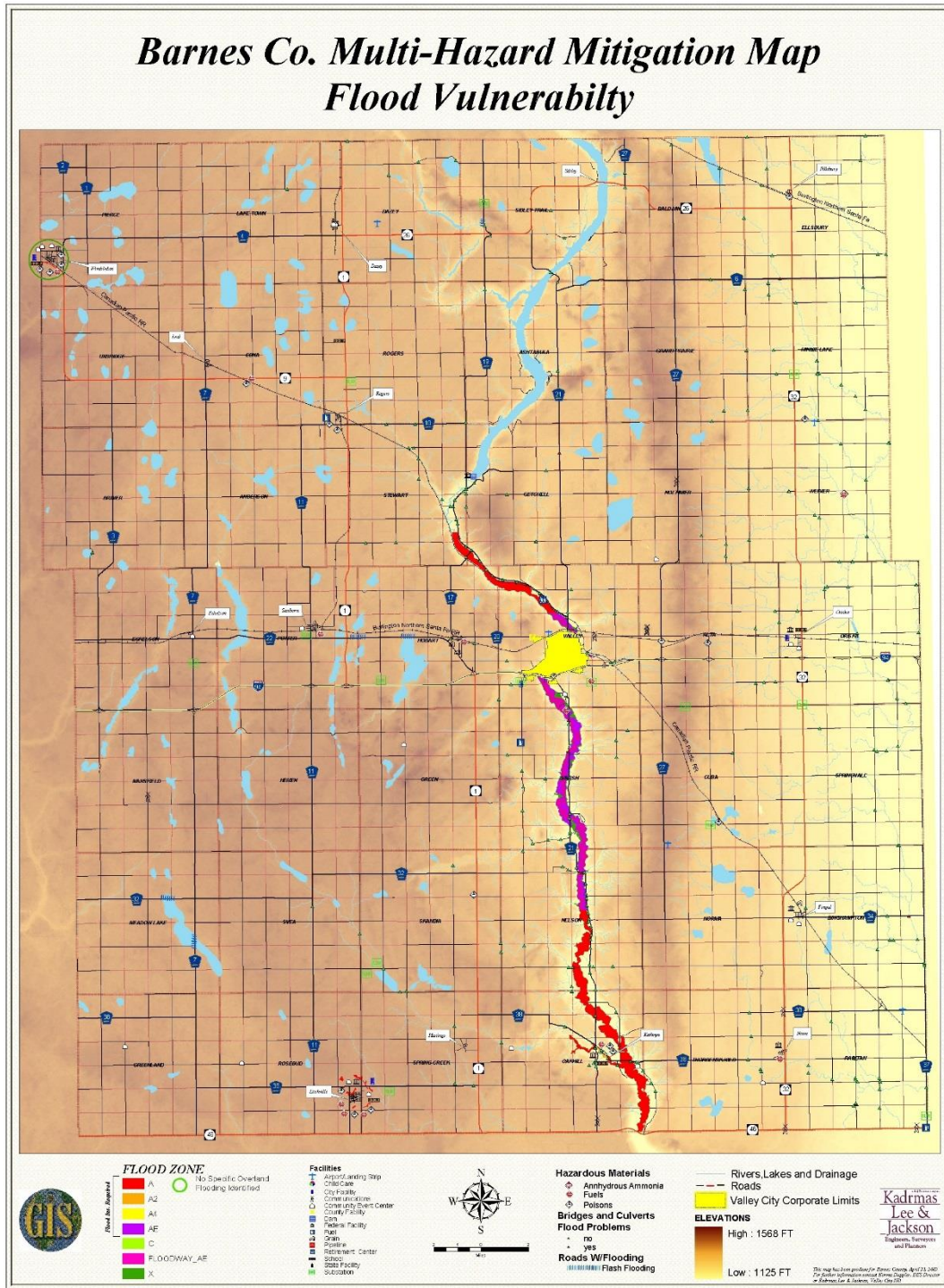
March 20, 2012 Valley City losses some of its trees to 2011 flooding due to length of time underwater. (Source: Valley City Times-Record)

Figure 5.4.2 – Valley City Flood Vulnerability



Source: 2010 Barnes County MHMP

Figure 5.4.3 – Barnes County Flood Vulnerability



Source: 2010 Barnes County MHMP

5.5 Geologic Hazard

Characteristics

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 North Dakota and are most commonly found within major river valleys and on engineered slopes along major transportation corridors. Landslides are dominantly found in two settings, controlled by the surface geology of the Great Plains in western and southwestern North Dakota and along major river valleys of the Missouri, Sheyenne, James, Souris, and Red Rivers (North Dakota Geological Survey).

History

Information provided by the 2010 Barnes County MHMP, 2012 Flood and Impact Grant Applications, Valley City Times-Record shows instances of landslide where 16 homes have been moved, damage to fiber optic cables have occurred, and roads have sunk. Table 5.5.1 summarizes the history of geologic hazard in Barnes County between 1993 and 2010 from information provided by the 2010 Barnes County MHMP and the Valley City Times-Record. No injuries, fatalities or crop damage were reported. Detailed data for the hazard can be found in the Hazard Profile and History section at the end of this chapter.

There have been no Presidential Disaster Declarations pertaining to landslide in Barnes County.

Table 5.5.1 – Barnes County Geologic Hazard History Summary

| Geologic Hazard (Landslide) | | | | | |
|-------------------------------------|-------------------|-----------------|-------------------|------------------------|--------------------|
| Number of Damaged Properties | Date Range | Injuries | Fatalities | Property Damage | Crop Damage |
| 16 | 1993 to 2014 | 0 | 0 | 36,976 | \$0 |

Sources: 2010 Barnes County MHMP, 2012 Flood and Impact Grant Applications, Valley City Times-Record

Probability and Magnitude

Geologic hazard in Barnes County has resulted in moving of 16 homes with more scheduled to be moved in the future as buyouts of homes in areas at risk continue. Fiber optic lines have also been damaged and may have resulted in disruptions to communications. Roads have sunk leading to some areas to experience isolation. Records show that approximately \$37,000 in property damage has occurred. Therefore, the probability of geologic hazard is 100 percent and magnitude depends on homes and infrastructure impacted. Figures 5.5.1 and 5.5.2 shows the areas subject to geologic hazard in Barnes County.

The magnitude of geologic hazard has so far been minimal in terms of actual damage to property and crops. Approximately 16 homes have been moved and infrastructure has been impacted. A fiber optic line near Kathryn was damaged due to shifting of roads from a landslide. It is unknown if a disruption in communications occurred due to the event. The Barnes County Rural Water District has replaced many water mains that have ruptured due to shifting soils. The magnitude of the hazard can be substantial as property damage occurs, and the potential for death, injury and disruptions to critical facilities and infrastructure is present.

Risk Assessment

Table 5.5.2 shows the risk assessment as determined by individual jurisdictions and the planning committee for geologic hazard. The risk assessment methodology can be found in the beginning of Chapter 5, Threat and Hazard Identification Risk Assessment. The total in Table 5.5.2 represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard. Only the jurisdictions of Barnes County, Sibley and Valley City are subject to geologic hazard.

Table 5.5.2 – Risk Assessment Summary Geologic Hazard Scored Chart

| Geologic Hazard (Landslide) | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|------------------------------------|---------------|------------------|-------------------|----------------------|---------------------|--------------|
| Barnes County | 2 | 3 | 2 | 3 | 2 | 8 |
| Kathryn | 4 | 3 | 3 | 4 | 1 | 13 |
| Sibley | 4 | 2 | 4 | 4 | 1 | 13 |
| Valley City | 3 | 2 | 3 | 3 | 1 | 10 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|--|
| Seasonal Pattern | Typically during the spring, summer, and fall during or after heavy rainfall or other weather events impacting stability of soil |
| Duration | Up to several minutes |
| Speed of Onset | Sudden to slow and steady |

Capabilities of and Vulnerabilities to Jurisdictions

Upon review of the statistics from the 2010 Barnes County MHMP, 2012 Flood and Impact Grant Applications, Valley City Times-Record, the cities of Sibley and Valley City are the only jurisdictions subject to the hazard. However, all jurisdictions are vulnerable to the hazard in some respect as disruptions to critical facilities and infrastructure can occur.

Capabilities and vulnerabilities of jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, property and economy • Reduction in tax base from loss of residential homes, cabins and recreational areas • Damage to streets, power lines, gas lines, electric lines • Disruption in transportation mobility • Disruption in communication • Potential for loss of drinking water • Potential loss of sewer service • Loss of power • Approximately 20 single-family homes have experienced sliding • Canadian Pacific railroad bed has been shifting in areas of the county |
| Frequency | 3 | <ul style="list-style-type: none"> • 14 incidents of landside have occurred between 1993 and 2010 |
| Likelihood | 2 | <ul style="list-style-type: none"> • Unstable and rocky terrain in areas around Valley City, the Sheyenne River and Lake Ashtabula • Soil types and changing in climate patterns increase chances of the hazard |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Bridges, roads, infrastructure • More vulnerable: Buried power lines and utility services • More vulnerable: Single-family subdivisions in and around Valley City and Lake Ashtabula |

| | | |
|-------------------|---|---|
| | | <ul style="list-style-type: none"> • Less vulnerable: Better awareness of soil types and better planning management for new development |
| Capability | 2 | <ul style="list-style-type: none"> • Active county commission • Administration and staff to assist in buyouts and moving of homes and infrastructure • Planning and regulatory limitations in place to limit development in areas at risk to the hazard • GIS and other mapping applications allowing appropriate studying of soils at risk to the hazard |

Vulnerabilities to County-Owned Buildings and Property

County-owned buildings and property are generally not at risk from geologic hazard. Landslides are considered in development of county-owned buildings and property and, as of 2014, no buildings or properties are known to be in areas at risk. An inventory of county-owned buildings and property is shown in Chapter 4, Profile and Inventory.

Vulnerabilities of Critical Facilities and Infrastructure

Transportation and utility infrastructure are most vulnerable to landslides. A map of the transportation system in Barnes County is shown in chapter 9. Roads are vulnerable to the hazard as they can be closed due to shifting soils, limiting transportation and economic activity. Impacts to roads and infrastructure can isolate people living in remote locations and smaller jurisdictions. Utility infrastructure such as fiber optic lines and water mains are vulnerable as they can be taken out of service if landslides impact their functionality.

Vulnerabilities to New and Future Development

New and future development should be restricted from development on slopes with excessive grade and soil types identified as prone to landslide. The areas vulnerable to landslide are identified in and around Valley City and are shown in Figures 5.5.2 and 5.5.3. Building code regulations and enforcement should be directed to these areas to ensure no new or future development occurs.

Data Limitations and Other Key Documents

A data limitation for understanding impacts from geologic hazard is the difficulty in identifying the extent of other local factors such as drainage, which impacts the amount of water in the soil and overall soil stability. Therefore, a process to determine near accurate loss estimates for geologic hazard is nearly impossible.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- North Dakota Emergency Operations Plan
- Barnes County Emergency Operations Plan

Hazard Profile and History

Detailed narratives of events from the 2010 Barnes County MHMP and newspaper articles from the Valley City Times-Record describe landslide events below. Figure 5.5.1 shows the landslide incidence and susceptibility in North Dakota by county, followed by Figures 5.5.2 and 5.5.3, which show the areas affected by the landslides in Barnes County. Figures 5.5.2 and 5.5.3 were moved forward from the 2010 Barnes County MHMP.

2010 Barnes County MHMP

1993 One home in the SW section of Valley City was lost to a landslide in 1993.

1997 A home slid in "Johnsonville" east of Valley City limits off Main Street.

1999 to 2001 Ten homes slid. Also, Valley City lost two streets. Barnes County lost one road off N.D. Highway 46 into Little Yellowstone Park. Barnes County lost one home.

1998 Relocation through a Valley City- FEMA project was attempted to a lot that slid.

June 15, 2007, 7:30 am Situation/Incident in Barnes County was reported for complications of the June 7th rain, mudslide. Damages to fiber optic cable from the roads and mudslide. A sonic alarm went off at 3:57 to alert Dickey Rural Network of a breach in the cable line somewhere in a 2mile stretch by Kathryn, ND. Barnes County/Valley City dispatch was called between 4:30 and 5:00am. The Sheriff's Department was called, Emergency Management was not alerted. The DRN road crew saw the mudslide and located the problem. A 400 ft. piece of cable was replaced and service was restored about noon.

Newspaper Articles for Geologic Hazards

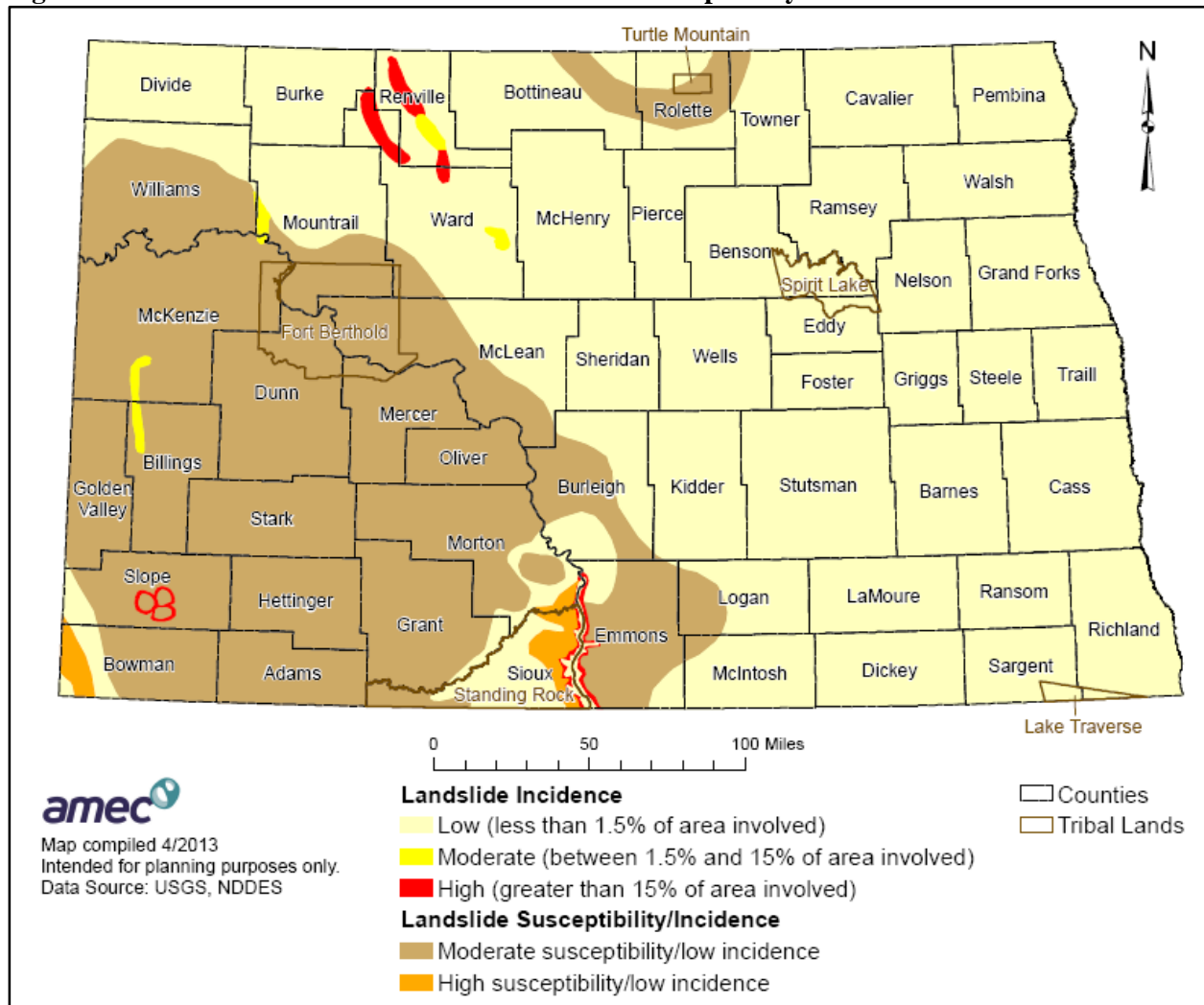
5/18/2011 The Katie Olson Recreation Area was closed in 2010 over safety concerns over the road leading to the subdivision. Erosion has caused the hillside to slide toward the shoreline of Lake Ashtabula, leaving cliffs in the gravel road that heads to the Katie's Landing properties, the road dropping nearly five feet in some areas. (Source: Valley City Times-Record)

10/22/2010 Damage from excess rains, wet conditions saturating the ground and underground springs have caused the ground to shift and landslides to occur at Lee's Subdivision. This results in sinking cabin which have needed to be moved, cracking foundations and a once rock road down to Lake Ashtabula is no longer usable as the land has shifted. Eight of roughly 25 homes in the area affected by the sloping land, which has created large cracks and unstable soil near some properties. (Source: Valley City Times-Record)

10/22/2010 Damage from excess rains, wet conditions saturating the ground and underground springs have caused the ground to shift and landslides. This results in sinking cabin which have needed to be moved, cracking foundations and a once rock road down to Lake Ashtabula is no longer usable as the land has shifted. (Source: Valley City Times-Record)

Figure 5.5.1 illustrates shows the areas of landslide incidence and susceptibility in North Dakota. According to the map, high and moderate landslide areas are located along the Missouri River in Sioux and Emmons counties, as well as in Bowman, Slope, Billings, McKenzie, Mountrail, Ward, and Renville counties. Barnes County has low susceptibility to landslide incidents.

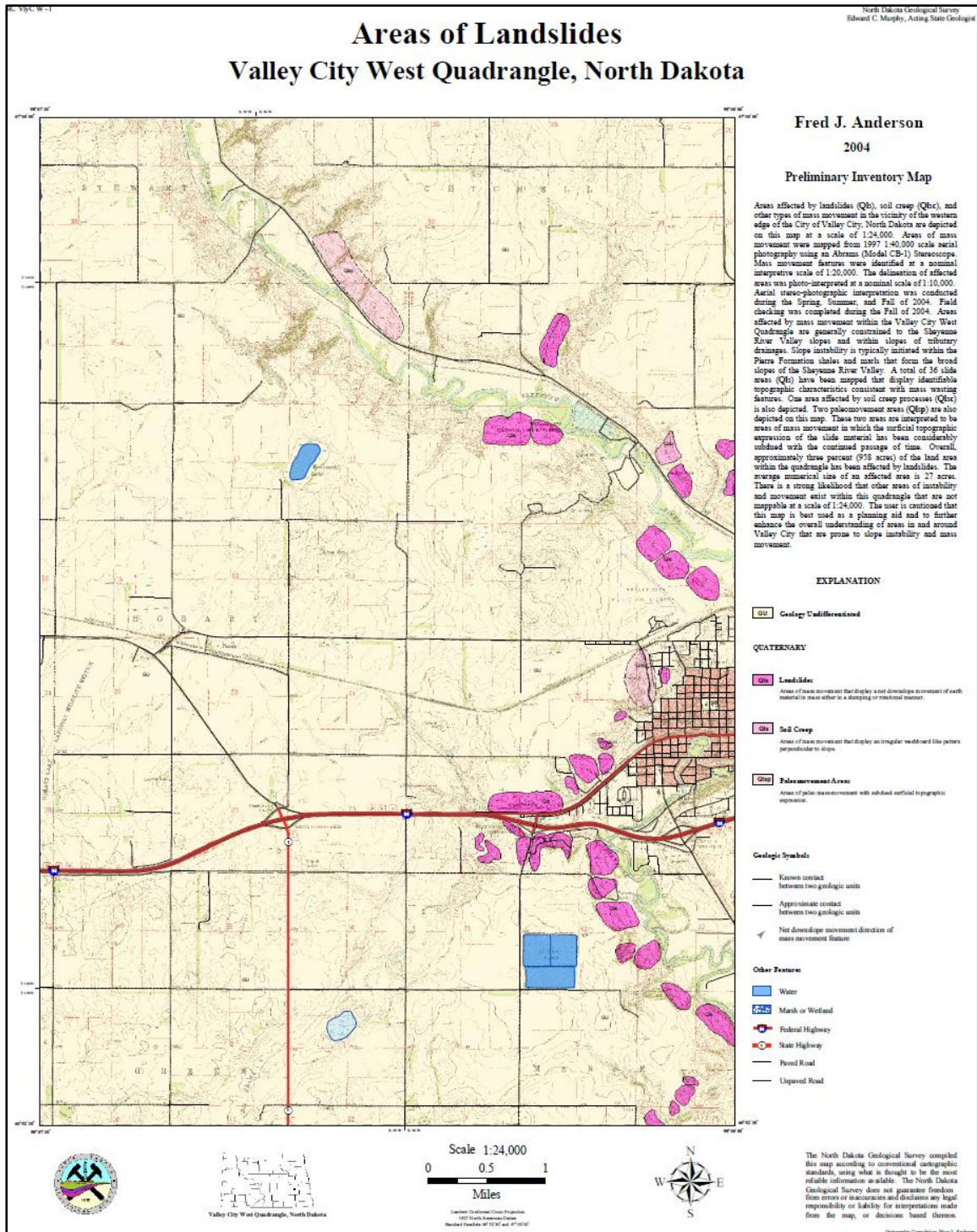
Figure 5.5.1 – North Dakota Landslide Incident and Susceptibility



Source: N.D. Department of Emergency Services

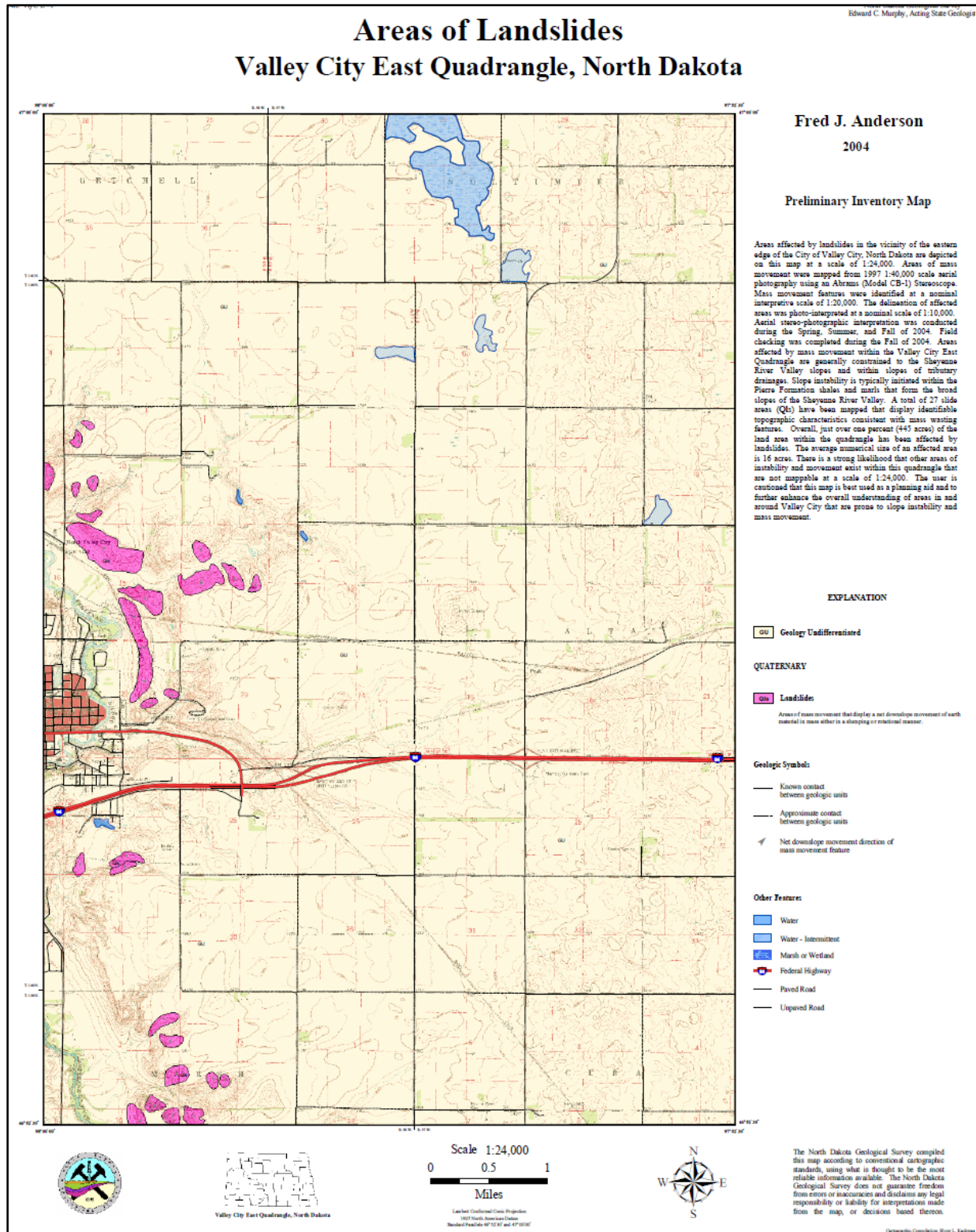
Figures 5.5.2 and 5.5.3 on the following pages show areas where landslides have occurred in Barnes County. Landslides are most prevalent in the topography surrounding Valley City, the county’s largest city.

Figure 5.5.2 – Areas of Landslides in Valley City West Quadrangle



Source: 2010 Barnes County MHMP

Figure 5.5.3 – Areas of Landslides in Valley City East Quadrangle



Source: 2010 Barnes County MHMP

5.6 Hazardous Material Release

Characteristics

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens. The term “hazardous material” covers a wide array of products, from relatively innocuous ones such as hair spray in aerosol dispensers and wash preservatives such as creosote to highly toxic or poisonous material such as polychlorinated biphenyl (PCB’s) and phosgene gas. The potential severity of hazards of these material is varied but the primary reason for their 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 poison inhalation (Class 6)
- Radioactive materials (Class 7)
- Corrosive substances (Class 8)
- Miscellaneous hazardous materials/products, substances, or organisms (Class 9)

Source: 2014 NDMHMP

Hazardous materials are defined and/or managed under a number of federal, state, and local laws, regulations, plans, and ordinances.

Further definitions can be found in laws, i.e. Federal Water Pollution Act, Clean Water Act, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) commonly known as Superfund, and Amendments, Low Level Radioactive Waste Policy Act, Nuclear Waste Policy Act, and the Hazardous Materials Transportation Act.

Hazardous material incidents can be categorized into two distinct groups – incidents of a transportation nature and those that occur at a stationary or fixed facility.

The former is an occurrence resulting in the uncontrolled release of materials during transport that are capable of posing a risk to health, safety, and property as determined in the Department of Transportation (DOT) regulations. Generally, such materials are classed identically to those of a stationary incident. Over 18,000 materials are covered under the DOT regulations. The population most seriously affected by a hazardous material release would be within a five mile circle around the site of the release. The denser the population in the circle the greater the expected losses. Likely sites are around major transportation routes such as highways, rail lines, or pipelines along which hazardous materials move.

A stationary hazardous material release is any occurrence resulting in the uncontrolled release of materials from a fixed site capable of posing a risk to health, safety, and property, as determined in Environmental Protection Agency regulations. Areas at risk include the locations of hazardous material

manufacturing, processing, or storage facilities, as well as all hazardous waste treatment, storage, and disposal (legal and illegal) sites.

Other significant hazardous material concerns are the hazardous by-products from the production of the drug methamphetamine. This drug is easily “cooked” up using readily available hazardous materials in clandestine labs. These labs may then be contaminated with a variety of toxic chemicals such as methanol, ether, benzene, methylene chloride, trichloroethane, toluene, muriatic acid, sodium hydroxide, anhydrous ammonia, and red phosphorus. Source: North Dakota Enhanced Hazard Mitigation Plan 2011.

Hazardous materials are also often used during terrorist attacks. They can cause damages to the water supply and food supply.

In the past, states and local governments have concentrated emergency preparedness (operational planning, training, etc.) activities solely to the transportation of hazardous material.

Since the amendments of CERCLA (Title III) Emergency Planning and Community Right-To-Know law, we have improved our hazardous material planning base for fixed facility disaster or emergency situations.

It is common to view hazardous material releases in a worst case scenario. However, the majority of these incidents involve small spills and releases requiring little response or recovery actions. The problem for decision makers at all levels of government is to create a safe system for the use, storage, transportation, etc. of hazardous materials while retaining the state’s economic viability.

Although many of the spills and releases are small, a single hazardous material release can result in the loss of many lives and cause millions of dollars of property damage. Water supplies, sewer lagoons, fish and wildlife habitats can be threatened if hazardous materials leak into rivers, streams, underground water resources.

Hazardous materials have major components that affect incident related response and recovery. These components include planning, organization of responders, training, equipment, and exercises. These elements combined can provide for an effective overall response. The chance remains that major harm may be incurred by first responders or the public. Due to the potential exposure of a hazardous material release at a fixed facility, the population in the related jurisdiction would be in the impact zone.

History

Table 5.6.1 summarizes incidents of hazardous material release in Barnes County. There were a total of 28 occurrences between 2006 and 2014 with five injuries and three fatalities. Property and crop damage is unknown. Barnes County Emergency Management provided the data. The detailed history of events can be found in Table 5.6.3 in the Hazard Profile and History section at the end of this chapter.

There have been no declared disasters or emergencies pertaining to hazardous material release in Barnes County.

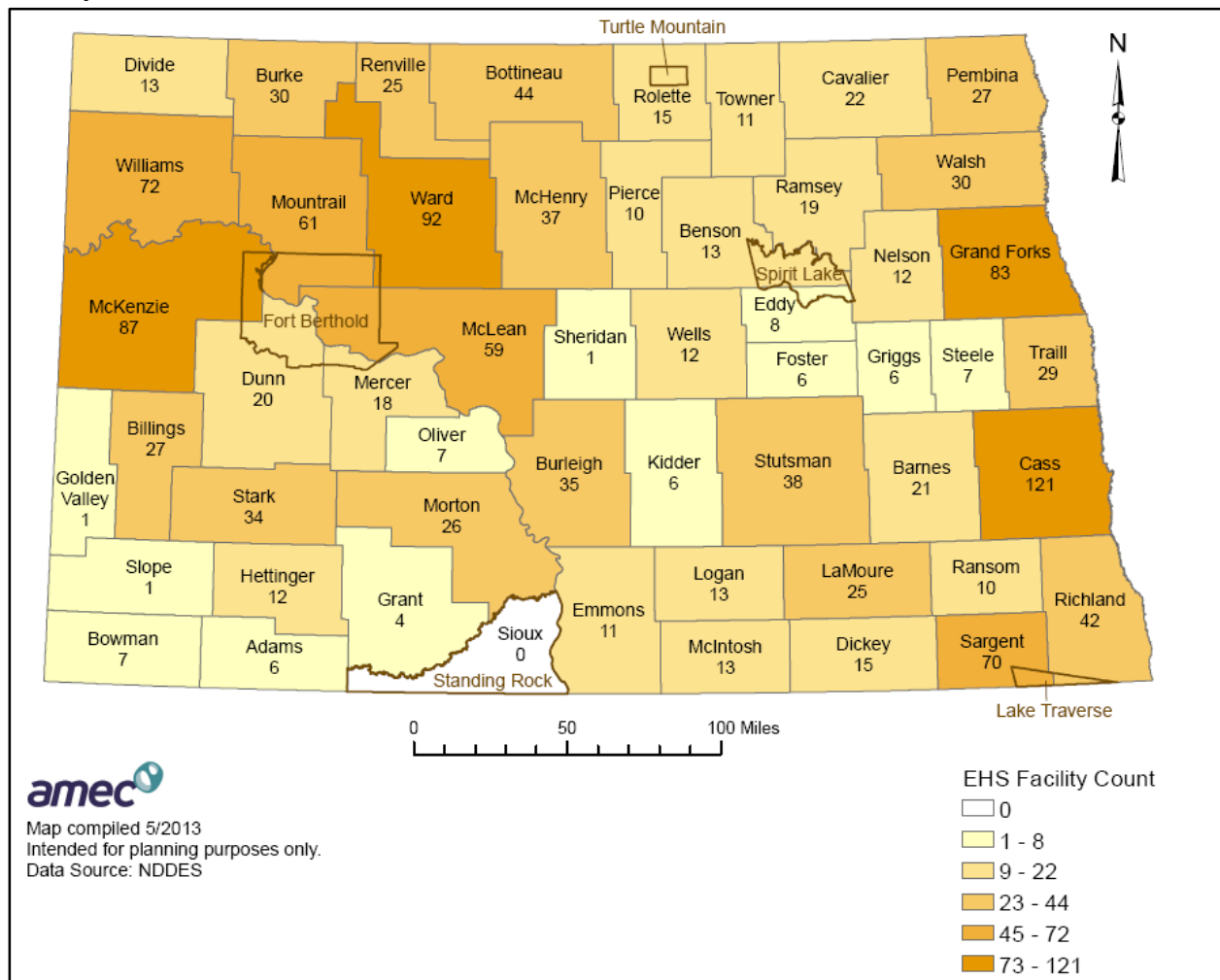
Table 5.6.1 – Barnes County Hazardous Material Release Summary

| Hazardous Material Release | | | | | |
|----------------------------|--------------|----------|------------|-----------------|-------------|
| Number of Occurrences | Date Range | Injuries | Fatalities | Property Damage | Crop Damage |
| 28 | 2006 to 2014 | 5 | 3 | Unknown | Unknown |

Source: N.D. State Radio, Barnes County Emergency Management

Figure 5.6.1 shows the number of extremely hazardous substance facilities in Barnes County as of 2011. In 2011, approximately 21 extremely hazardous substances facilities are in Barnes County. These facilities are required under the Occupational Safety and Health Administration (OSHA) regulations to maintain data on material safety and report quantities of chemicals that are equal or greater than 500 pounds. The facilities are most likely related to the agriculture industry and are located within city limits.

Figure 5.6.1 – 2011 Number of Extremely Hazardous Substance Facilities in North Dakota by County



Source: North Dakota Department of Emergency Services, 2014 NDMHMP

Probability and Magnitude

As shown in Table 5.6.1, in 2012 there were 28 occurrences of hazardous material release between 2006 and 2014, resulting in a probability of three to four hazardous material releases each year. Given that the local economy is heavily reliant on agriculture and the amount of extremely hazardous substance facilities in Barnes County, as shown in Figure 5.6.1, it is likely a hazardous material release will occur in Barnes County more frequently in the future. Therefore, the probability is assumed to be 100 percent. The magnitude of a hazardous material release can vary from minimal in localized incidents to catastrophic in situations of explosions or high wind. Releases when high winds are present may carry chemicals and material great distances and impact many people.

Risk Assessment

Table 5.6.2 shows the risk assessment as determined by individual jurisdictions and the committee. The total in this chart represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 5.6.2 – Risk Assessment Summary Hazardous Material Release Scored Chart

| Hazardous Material Release | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|----------------------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 4 | 4 | 4 | 4 | 1 | 15 |
| Dazey | 4 | 2 | 3 | 3 | 1 | 11 |
| Fingal | 4 | 3 | 4 | 4 | 1 | 14 |
| Kathryn | 2 | 2 | 2 | 2 | 1 | 7 |
| Leal | 4 | 2 | 4 | 4 | 1 | 13 |
| Litchville | 3 | 2 | 1 | 2 | 3 | 5 |
| Nome | 4 | 1 | 2 | 3 | 1 | 9 |
| Oriska | 4 | 1 | 4 | 4 | 1 | 12 |
| Pillsbury | 4 | 2 | 4 | 3 | 1 | 12 |
| Rogers | 4 | 2 | 3 | 1 | 1 | 9 |
| Sanborn | 4 | 2 | 4 | 4 | 1 | 13 |
| Sibley | 4 | 2 | 1 | 2 | 1 | 8 |
| Valley City | 4 | 2 | 3 | 4 | 1 | 12 |
| Wimbledon | 4 | 2 | 4 | 4 | 2 | 12 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|--------------------------|
| Seasonal Pattern | Summer |
| Duration | Application of chemicals |
| Speed of Onset | Immediate |

Capabilities of and Vulnerabilities to Jurisdictions

Upon review of statistics from the 2014 NDMHMP and information provided by Barnes County Emergency Management, the frequency, likelihood and vulnerabilities of hazardous material release varied based on the location of industry and infrastructure. Impact was scored “3” or “4” in Barnes

County and city jurisdictions, with the exception of Kathryn. The capabilities for hazardous material release is shared across the county by the Emergency Management Department.

Capabilities and vulnerabilities of jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Potential loss of life • Loss of economy from crops and livestock • Damage to environmentally-sensitive areas and habitats from saturation of chemicals into the soil • Loss of wildlife • Contamination of drinking water supplies for people and livestock • Potential for fire as a secondary impact • Blocked road and loss of transportation mobility • The hospital and medical facilities would be shut down due to increased change of contamination • Increase of crime from looting • Can result in uninhabitable areas from leaks, spills or contaminations |
| Frequency | 4 | <ul style="list-style-type: none"> • Never had any major occurrences resulting in mass casualties • No incidents of major leaks from storage tanks • 12 incidents between 2006 and 2013 resulting in three injuries and two fatalities |
| Likelihood | 4 | <ul style="list-style-type: none"> • Hazard is likely in the future due to the presence of chemicals in the agriculture sector being hauled in and around the county by truck • Increased industrialization and chemicals in agriculture will likely result in more hazardous material releases • Increase in transportation of oil and other chemicals from the oil patch • 92 Tier II reported hazardous chemical facilities in 2011 • Pipelines running through Barnes County carrying hazardous materials • Increase in transportation of chemicals; Interstate, railroad and other truck hauling • Potential for additional anhydrous plant on west boarder of county |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Crops and livestock • More vulnerable: Increased truck traffic • More vulnerable: Increase in chemicals used in agriculture operations • More vulnerable: More chemicals being stored on farm sites • More vulnerable: Presence of large propane tanks for residential and commercial use |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Prolonged response times from emergency services for rural communities • More vulnerable: Lack of medical clinic, hospital or local ambulance in rural areas (including 12 smaller cities) • More vulnerable: Only awareness trained Fire Departments in Barnes County • More vulnerable: Lack for reporting of chemicals stored in various locations in the agriculture communities • Less vulnerable: Installation of new cell tower increased reception |
| Capability | 1 | <ul style="list-style-type: none"> • Active County Commission • Contracts for engineering, planning and grant writing • GIS services are provided by the state and engineering firms • Relies on regional, state and other entities for assistance with major projects • Does not have financial resources to accomplish projects independently • Active emergency management department with education and outreach capabilities • County has county-wide mutual aid agreement signed for emergency services |

Vulnerabilities to County-Owned Buildings and Property

All county-owned buildings are at risk to hazardous material release as this type of hazard can occur anywhere at any given time for a multitude of reasons. However, facilities located near or adjacent to transportation modes, such as highways, railroads or airports, are more at risk as the hazard typically occurs during transportation of hazardous material. If facilities are located near fixed hazardous material sites, such as propane or anhydrous ammonia tanks, the risk is increased as the source for the hazard will always be present. If an explosion were to occur, critical facilities located in close proximity could experience moderate to severe damage, depending on the intensity and duration of the release. Chapter 4 provides a summary of county and city owned buildings in Barnes County. Figure 5.6.2 shows the locations of hazardous materials sites in Valley City.

Vulnerabilities of Critical Facilities and Infrastructure

Similarly to county-owned buildings, the vulnerability of the hazard to critical facilities and infrastructure depends largely on location. Critical facilities and infrastructure located near hazardous material storage sites are most at risk. Depending on the facility or infrastructure, impact could range from moderate to severe. Water infrastructure could become contaminated and threat public health. Critical facilities such as hospitals or emergency services could be shut down temporarily or indefinitely. If a release were to occur on a major roadway, emergency services would be limited and response times could be drastically reduced. Chapter 4 provides a summary of county and city owned buildings in Barnes County. Figure 5.6.2 shows the locations of hazardous materials sites in Valley City.

Vulnerabilities to New and Future Development

The vulnerability of new and future development depends largely on the type and density being proposed and where development is allowed. Residential development should be developed in areas away from

hazardous material storage sites or major transportation arteries where chemicals are transported. If new development is already in progress and near the hazard area, a development moratorium should be implemented to stop future growth or densities should be limited to reduce the number of people potentially at risk. Industrial development is a sector that maintains demand for hazardous material and is best situated near storage sites or transportation arteries to limit time spent in transit. Ultimately, hazardous material should be prohibited from locating in residential or commercial areas, near hospitals, schools or community gathering spaces. If already existing, plans should be put into place for relocation at a future time when funding permits or an appropriate site becomes available.

Data Limitations and Other Key Documents

The difficulty in understanding the particulars of a hazardous material release (location, time of day, and what material are involved) limits the ability to understand the true impact of the hazard. With numerous sources for potential release, whether from the agriculture sector, oil and gas sector, commercial and residential entities, or a combination from another hazard such as a transportation accident, understanding how releases occur and identifying ways to mitigate this hazard proves impractical. Developing an inventory from agriculture and commercial operations on the location and type of hazardous material being used in economic activity, and what mode is being utilized for transportation, would assist in understanding the hazard.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- North Dakota Emergency Operations Plan, Hazardous Material Annex
- Barnes County Emergency Operations Plan

Hazard Profile and History

Data for hazardous material release in Barnes County was provided Barnes County Emergency Management and is shown in Table 5.6.3. Figure 5.6.2 illustrates the locations hazardous materials sites in the City of Valley City. Figure 5.6.3 illustrates the extent of pipelines in the State of North Dakota and shows that one refined petroleum pipelines traverses Barnes County in a north-south direction. Newspaper articles for the hazard were provided by the Valley City Times-Record and can be found after Figure 5.6.3

According to the 2010 Barnes County MHMP, Barnes County has had few hazardous materials incidents.

- Valley City has had multiple anhydrous ammonia and fuel spills, one house explosion.
- In 2002, natural gas lines were cut in the SW portion of town and the NW.
- Barnes County has had numerous anhydrous spills, two sulfuric acid spills, one 6,000 gallon road oil spill, one garage explosion from a methamphetamine lab in Nome, and numerous other petrochemical and herbicide spills.

Table 5.6.3 – 2006 to 2013 Hazardous Material Release Events in Barnes County

| Begin Date | Location | Incident Type | Material Released | Duration | Volume/Units | Injuries | Fatalities | Cause of Release | Source |
|------------|--|--|-----------------------|------------|--------------|----------|------------|---|---|
| 5/29/2006 | Approximately one mile east of the Peak Interchange, east of Valley City, within the median of Interstate 94 near Mile Marker 297. | Vehicle Accident | Antifreeze - Prestone | 7 hours | 500 gal. | 1 | 0 | Semi truck trailer lost control and rolled into the median releasing several containers of antifreeze. | 2010 Barnes County MHMP |
| 6/1/2006 | In ditch of State Highway #1 near Valley City, GPS coordinates are N 46.86817 W 98.08067 | Tank shifted and broke a fitting on pump | Tordon & 24, D | 1.5 hours | 15 gal. | 0 | 0 | Truck drove off outside bank, tank shifted and broke fitting on tank. Quick thinking on the part of the driver and passenger helped make sure that the spill was small. | 2010 Barnes County MHMP |
| 7/19/2006 | Approximately 3 miles east and 1 mile south of Valley City. | Vehicle Accident | Roundup and Tiaga | 15 minutes | 100 gal. | 1 | 0 | Vehicle accident involving the coops spray truck. | 2010 Barnes County MHMP |
| 11/28/2006 | In the westbound I-94 ditch just past the westbound on-ramp to I-94 from ND 1 south (exit 288) lat-long of 46.91228, -98.08739 | Vehicle Accident | diesel fuel | 5 minutes | 50 gal. | 0 | 0 | A semi cargo van lost control on I-94 westbound just west of exit 288 because of slippery conditions, resulting in a punctured driver's side fuel tank. | 2010 Barnes County MHMP |
| 4/21/2008 | N/A | Hydraulic fluid line leak | Hydraulic Fluid | 10 minutes | 10 gal. | 0 | 0 | Caller related that a hydraulic fluid line on a high rail truck broke which caused approximately 5 to 10 gallons of fluid to leak onto the ground. Caller also related that the fluid was cleaned up. | 2010 Barnes County MHMP |
| 5/5/2008 | I-94, Mile marker 290 | Tank leak | Diesel Fuel | N/A | Unknown | 0 | 0 | Semi was leaking fuel from it's tank. | North Dakota Department of Emergency Services Web-EOC |
| 5/23/2008 | Valley City, ND | Tank leak | Hydraulic Fluid | 1 minute | 1 lb. | 0 | 0 | Hydrolic system o-ring failure on truck. | 2010 Barnes County MHMP |
| 6/9/2008 | 24th St. SE, Rogers, ND | Tank leak | Powermax Roundup | 5 minutes | 75 gal. | 0 | 0 | Tank rolled off vehicle upside-down into ditch, bung leaked from top of tank | 2010 Barnes County MHMP, North Dakota Department of Emergency Service Web-EOC |
| 9/24/2008 | Tesoro Station 2109 S University Ave, Fargo, ND | Tank leak | Gasoline | N/A | N/A | 0 | 0 | N/A | 2010 Barnes County MHMP |
| 10/26/2008 | Rural Barnes County, 4th St. and 99th Ave. | Torn Hose on Storage Tank | Anhydrous Ammonia | N/A | Unknown | 0 | 0 | Hose on anhydrouse tank was torn on digger. | North Dakota Department of Emergency Services Web-EOC |
| 11/25/2008 | Approximately 15 miles NE of Valley City, 5 miles south of Luverne | Tank leak | Diesel Fuel | 8 | 15 | 0 | 0 | "Slip" diesel tank (portable tank) in back of pick-up truck leaked overnight, approximately 10-15 gallons | 2010 Barnes County MHMP |
| 9/19/2010 | Cenex - Sanborn | Tank leak | Anhydrous Ammonia | 30 Minutes | Unknown | 0 | 0 | Valve malfunction on tank | Barnes County Emergency Management Incident Reports |
| 12/21/2010 | Interstate 94, Mile Marker 282 | Accident | Gasoline | N/A | Unknown | 1 | 0 | Pickup rolled over in accident dislodging gastank from vehicle. | Barnes County Emergency Management Incident Reports |
| 4/22/2011 | Rural Banres County, Rail Road Mile Post 50 - Barnes Cass Border | Railroad Derailment | diesel fuel | N/A | 100 Gallons | 0 | 0 | Mechanical Failure | Barnes County Emergency Management Incident Reports |
| 5/19/2011 | Interstate 94, Mile Marker between 301 and 302 | Accident | Diesel Fuel | N/A | Unknown | 1 | 0 | Semi rearended DOT sand truck, damaged fuel tanks leaked. | Barnes County Emergency Management Incident Reports |
| 6/1/2011 | Rest Area, west of Oriska | Tank leak | Diesel Fuel | N/A | 2 Gallons | 0 | 0 | Leak in tank. | Barnes County Emergency Management Incident Reports |
| 7/1/2011 | Agroline - Wimbledon | Tank leak | Anhydrous Ammonia | N/A | N/A | 1 | | A man received third-degree burns as a result of an anhydrous ammonia leak while he was fixing a hose on the job at Agroline in Wimbledon. | Valley City Times-Record |

Source. Barnes County Emergency Management, N.D. Department of Public Health, Valley City Times Record

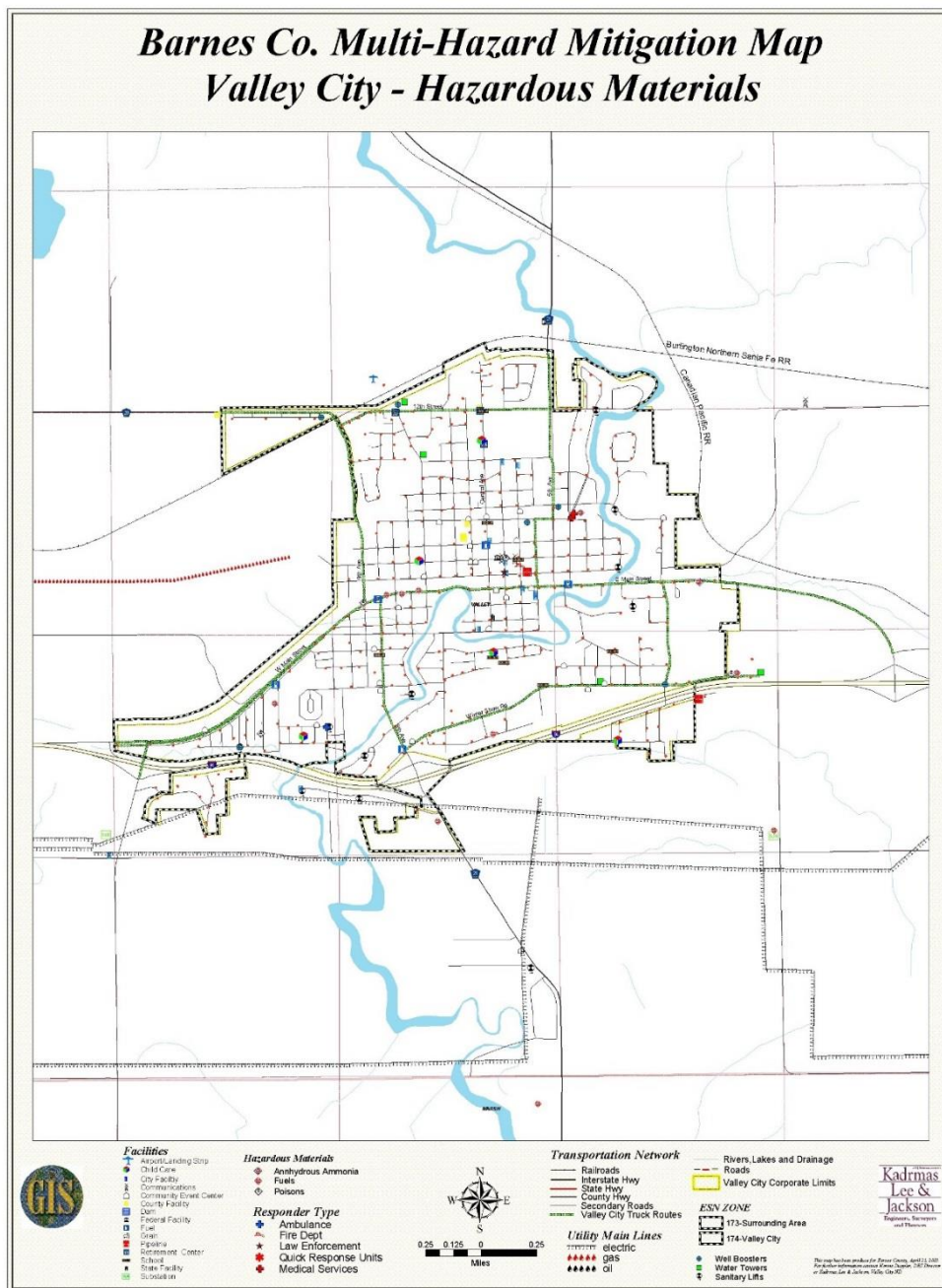
Table 5.6.3 – 2006 to 2013 Hazardous Material Release Events in Barnes County – Continued

| | | | | | | | | | |
|-----------|--|------------------------------|--------------------|------------|-------------------|---|---|---|---|
| 8/9/2011 | Intersection of N.D. Hwy 1 and N.D. Hwy 46. | Vehicle Accident | Fuel | N/A | N/A | 0 | 2 | A semi headed east on Hwy 46 failed to stop at the intersection of Hwy 1. A northbound truck struck the eastbound truck. Both trucks came to rest in the northeast ditch of the interchange. Both drivers died on the scene. Witnesses described a fiery explosion as the fuel tanks of one of the truck erupted. | Valley City Times-Record |
| 8/23/2011 | 208 Market St., Litchville | Chemical Release Due to Fire | Dry Fertilizer | 2 hours | 200 Gallons MIXED | 0 | 0 | Lightning started fire at dry chemical storage. Water runoff from fire was collected after the chemical mixed | Barnes County Emergency Management Incident Reports |
| 9/30/2011 | Excel Energy Pipe Line, Oriska | Gas Line Break | Gas Line | 50 Minutes | Unknown | 0 | 0 | Pipe line failure, cause unknown. | Barnes County Emergency Management Incident Reports |
| 4/8/2012 | Rural Barnes County, 111th Ave. SE and 31st St. SE | Tipped Trailer | Fertilizer mixture | N/A | 20,000 Pounds | 0 | 0 | Operator Error | Barnes County Emergency Management Incident Reports |
| 4/19/2012 | Rural Barnes County, by Sanborn | Vehicle Accident | Urea Mez | N/A | 1000 pounds | 0 | 0 | Terragator applicator went into ditch | Barnes County Emergency Management Incident Reports |
| 5/24/2012 | Railroad Mile Post 270 by Fingal | Equipment Damage | Hydrolic Oil | N/A | 40 Gallons | 0 | 0 | Equipment parked by the railroad was leaking hydrolic oil. | Barnes County Emergency Management Incident Reports |
| 5/31/2012 | 13172 47th St. SE | Equipment Damage | Hydrolic Oil | N/A | 10 Gallons | 0 | 0 | Hydraulic Hose Burst | Barnes County Emergency Management Incident Reports |
| 9/7/2012 | Barnes County Airport | Airplane Accident | Airplane Fuel | N/A | Unknown | 0 | 1 | Airplane Accident | Barnes County Emergency Management Incident Reports |
| 8/21/2013 | Near FEI, Inc. building in Valley City | Punctured natural gas line | Natural Gas | N/A | N/A | 0 | 0 | A post hole digger being used by a fence company punctured a natural gas line near the FEI Inc. building at 913 14th St SW in Valley City. The Valley City Fire Department Chief said the gas leak caused by the digger was a small one. Firefighters and police evacuated the business and blocked off the road for about a half hour. | Valley City Times-Record |
| 1/7/2014 | Rural Barnes County, 3461 118th Ave. SE | Tank Overflow | Transformer Oil | 5 Minutes | 100 Gallons | 0 | 0 | Water leaked into transfer valve. Cold weather froze the valve and broke it open. | North Dakota Department of Emergency Services Web-EOC |
| 4/3/2014 | Rural Barnes County, 123rd Ave. SE | Tank Leak | Anhydrous Amonia | 26 Days | 298 Pounds | 0 | 0 | The exact time is unknown. Nurse tank stored for winter, is believed to releas as a result of temperature changes loosening the valve from train vibrations or potentially from tampering. | North Dakota Department of Emergency Services Web-EOC |
| Total | | | | | 15 | 5 | 3 | | |

Source. Barnes County Emergency Management, N.D. Department of Public Health, Valley City Times Record

Figure 5.6.2 shows the hazardous materials sites in Valley City. Knowing the locations of hazardous material sites is important for mitigation to implement planning and regulation of new and future development in appropriate areas away from hazardous sites.

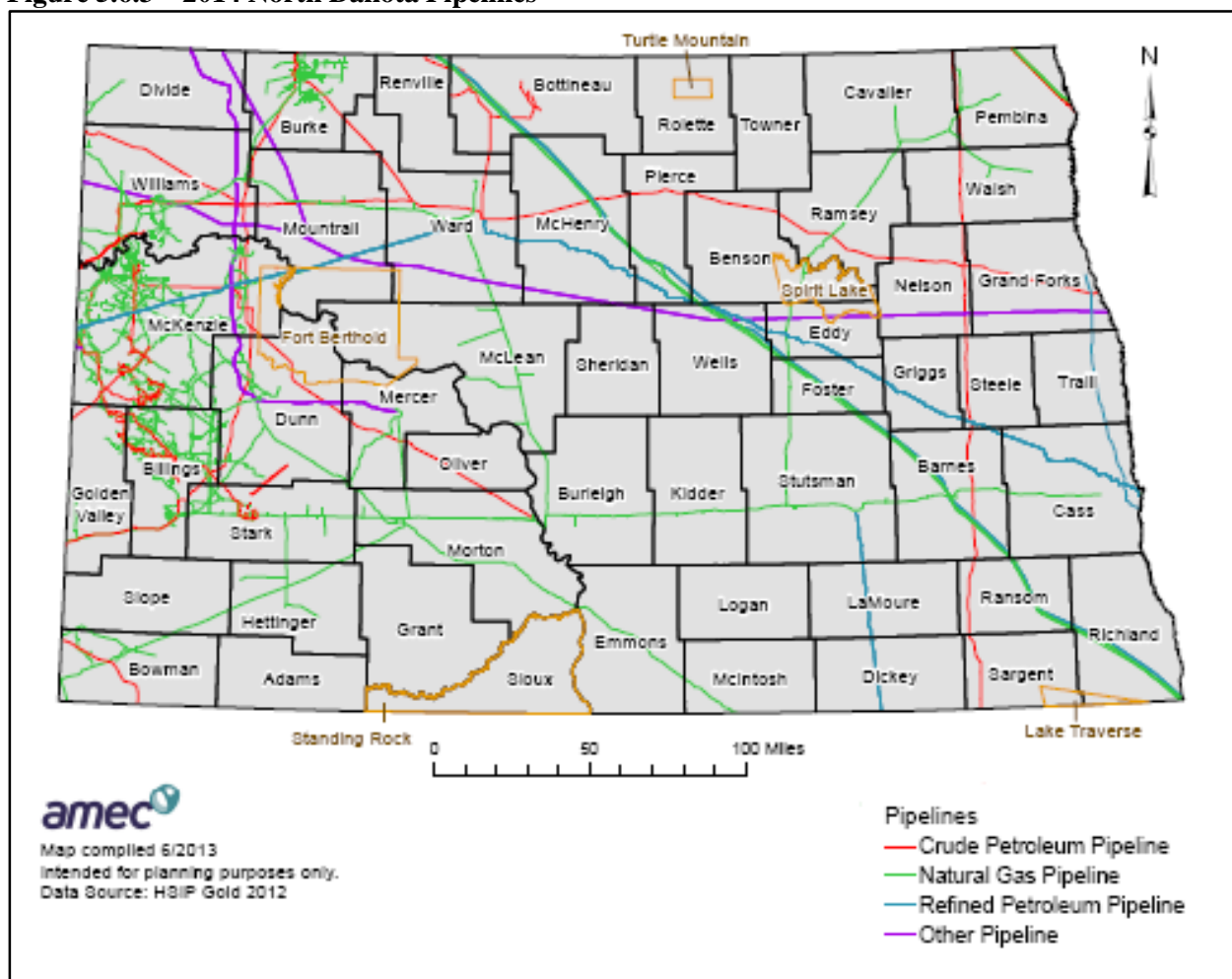
Figure 5.6.2 – Valley City Hazardous Materials Site Map



Source: Barnes County Emergency Management

Figure 5.6.3 shows the system of pipelines in the North Dakota, which consists of crude petroleum pipelines, natural gas pipelines, refined petroleum pipelines and other pipelines. Pipelines traversing Barnes County consists of 93 miles of gas transmission pipelines and 146 miles of hazardous material liquid pipelines. These pipelines consist of 4.70 percent of the total pipelines in the State of North Dakota.

Figure 5.6.3 – 2014 North Dakota Pipelines



Source: North Dakota Department of Emergency Services

Newspaper Articles for Hazard Material Release

August 9, 2011 Two die in fiery semi-truck crash east of Litchville at the intersection of N.D. Hwy 1 and N.D. Hwy 46. A semi headed east on Hwy 46 failed to stop at the intersection of Hwy 1. A northbound truck struck the eastbound truck. Both trucks came to rest in the northeast ditch of the interchange. Both drivers died on the scene. Witnesses described a fiery explosion as the fuel tanks of one of the truck erupted. Responding agencies included the N.D. Highway Patrol, the Barnes and LaMoure County Sheriff's Departments, Marion, LaMoure, and Valley City Fire and Rescue departments and the Barnes County Ambulance. At time of press the accident remained under investigation.

August 15, 2013 On 7/1/11 a man received third-degree burns as a result of an anhydrous ammonia leak while he was fixing a hose on the job at Agroline in Wimbledon.

August 21, 2013 A post hole digger being used by a fence company punctured a natural gas line near the FEI Inc. building at 913 14th St SW in Valley City. The Valley City Fire Department Chief said the gas leak caused by the digger was a small one. Firefighters and police evacuated the business and blocked off the road for about a half hour. (Valley City Times-Record)

5.7 Homeland Security Incident

Characteristics

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. Forms of civil unrest can range from groups blocking sidewalks, roadways, and buildings to mobs rioting and looting. Civil unrest may be spontaneous, as when a mob erupts into violence, or it may be planned, as when a demonstration or protest intentionally interferes with another individual's or group's lawful business.

Universities, industry, government officials and buildings, power grids, telecommunication systems, dams, water supplies, and pipelines are potential terrorism targets. Another potential terrorist activity that must be considered is violence in the workplace.

- Chemical Terrorism – use of chemical agent to poison, kill, or incapacitate the population or animals, destroy crops or national resources, or deny access to certain areas.
- Bioterrorism – use of biological agents, such as Anthrax, Ricin, or Smallpox, to infect the population, plants, or animals with disease
- Radiological/Nuclear Terrorism – use of radiological dispersal devices, nuclear weapons, or nuclear facilities to attack the population.
- Cyber Terrorism – attack or hijack of the information technology infrastructure that is critical to the US economy
- Civil Unrest and Violence – occurs on a smaller scale than terrorism with larger groups

Source: 2014 MHMP

History

No history was available pertaining to homeland security incidents in Barnes County. Oral history from county residents indicate that bomb and other security threats to public schools may have occurred over the past decade.

There have been no declared disasters or emergencies pertaining to homeland security incident in Barnes County.

Probability and Magnitude

Determining the probability of the homeland security incident hazard on Barnes County is difficult at best as no data on any historical incidents is available. The only data available regarding the hazard was obtained from the North Dakota State Fire and Tornado Fund and is shown in Table 5.6.2, which shows roughly \$27,000 paid to facilities in Barnes County for claims on theft and vandalism. Aside from this dataset, the lack of alternative data results in the inability to calculate a probability for the hazard. However, during jurisdictional meetings, city council members and meeting participants said that there is always a chance for an incident to occur at any time and no community is immune to the hazard. The probability is much lower in jurisdictions without schools since schools in the United States have had numerous incidents. An incident could have a large magnitude. However, impact would be limited due

to the rural nature of Barnes County, which has a population density of 7.4 people per square mile. Since the economy of Barnes County is largely based on agriculture and manufacturing, an incident involving agriculture or at a manufacturing facility has the potential to be disastrous and large in magnitude. Crops, agricultural and manufactured products are shipped across the United States. If a homeland incident were to target agriculture products through contamination using chemicals, the impact could be far-reaching with the potential to affect hundreds to tens-of-thousands of people.

Risk Assessment

Table 5.7.1 shows the risk assessment as determined by individual jurisdictions and the committee. The risk assessment methodology can be found in Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction’s impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction’s capabilities to respond to the hazard.

Table 5.7.1 – Risk Assessment Summary Homeland Security Incident Scored Chart

| Homeland Security Incident | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|----------------------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 4 | 3 | 4 | 4 | 1 | 14 |
| Dazey | 4 | 2 | 3 | 3 | 1 | 11 |
| Fingal | 4 | 2 | 3 | 3 | 1 | 11 |
| Kathryn | 2 | 2 | 2 | 2 | 1 | 7 |
| Leal | 4 | 2 | 2 | 3 | 2 | 9 |
| Litchville | 1 | 1 | 1 | 1 | 2 | 2 |
| Nome | 4 | 1 | 1 | 2 | 1 | 7 |
| Oriska | 2 | 2 | 2 | 2 | 1 | 7 |
| Pillsbury | 2 | 2 | 2 | 2 | 1 | 7 |
| Rogers | 2 | 2 | 2 | 3 | 1 | 8 |
| Sanborn | 4 | 1 | 2 | 4 | 1 | 10 |
| Sibley | 4 | 2 | 1 | 3 | 1 | 9 |
| Valley City | 4 | 3 | 3 | 4 | 2 | 12 |
| Wimbledon | 4 | 2 | 2 | 4 | 1 | 11 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|------------------------|
| Seasonal Pattern | None |
| Duration | Low |
| Speed of Onset | Little time or warning |

Capabilities of and Vulnerabilities to Jurisdictions

Data and statistics pertaining to homeland security incident were unavailable primarily due to the lack of incident of the hazard occurring in the county.

Capabilities and vulnerabilities of jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the

incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Potential loss of economy, livestock and life • Disruption of services to maintain economic activity and daily life • Harm to reputation of the county as a safe place to reside causing damage to economic growth and decline in school enrollments • Potential exodus of people resulting in permanent population loss |
| Frequency | 3 | <ul style="list-style-type: none"> • Security threats have occurred in public schools in recent years |
| Likelihood | 4 | <ul style="list-style-type: none"> • Always a possibility of an event occurring in the future • No dense or large population in the area • Presence of Valley City State University and major employers may increase likelihood of an attack • Wintershow event in Valley City along with other large in events in the couth where large groups of people congregate • Railroad transportation carrying oil and other hazardous chemicals |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Limited law enforcement staff and resources • More vulnerable: Denser population in and around Valley City • More vulnerable: Highline Bridge carrying hazardous materials high over Valley City and the Sheyenne River • Less vulnerable: Inadequate mental health services in the county and state • Less vulnerable: Sparse population and rural nature of the county • Less vulnerable: Better security has been implemented at schools |
| Capability | 1 | <ul style="list-style-type: none"> • Relies on regional, state and federal agencies for assistance • Does not have resources to accomplish projects independently • Active emergency management department with education and outreach available on the department’s website |

Vulnerabilities to County-Owned Buildings and Property

County-owned buildings and infrastructure are vulnerable to homeland security incidents. Facilities supporting functions key to daily operations of the county, such as buildings supporting emergency services and county shops for snow removal, would be the most vulnerable as an attack. A summary of county-owned buildings is provided in Chapter 4.

Vulnerabilities of Critical Facilities and Infrastructure

The Barnes County Courthouse in Valley City would be the critical facility most at risk to a homeland security incident. Incidents affecting infrastructure such as roads, hospitals, water pipes and power lines

can disrupt economic activity, limit access for emergency services, and put people at risk due to a shortage or outage of critical materials and infrastructure. Table 5.6.2 illustrates vandalism and theft claims paid on critical facilities insured by the State of North Dakota from 1989 to 2013. In total, \$2,206 was paid to state agencies, \$3,474 to state universities, \$9,695 to the local government and \$11,859 to school districts. No claims were paid to adjutant general entities in Barnes County.

Table 5.7.2 – 1989 to 2013 Vandalism and Theft Claims Paid on Critical Facilities Insured by State

| | State Agencies | Adjutant General | State Universities | Local Governments | School Districts | Total |
|------------|----------------|------------------|--------------------|-------------------|------------------|-----------------|
| Barnes Co. | \$2,206 | \$0 | \$3,474 | \$9,695 | \$11,859 | \$27,234 |

Source: North Dakota State Fire and Tornado Fund, 2010; N.D. Department of Emergency Services

According to the 2014 NDMHMP, the North Dakota Critical Infrastructure Program identified specific facilities, also referred to as Critical Infrastructure and Key Resources, are critical to homeland security in seven different sectors. These sectors are:

- 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

According to the 2014 NDMHMP, there is one energy, two public health, two transportation, three emergency services, one communications and two water Critical Infrastructure and Key Resources facilities for a total of 11 Critical Infrastructure and Key Resources facilities in Barnes County. Chapter 4 provides an inventory of county and city owned property in Barnes County.

Vulnerabilities to New and Future Development

Since incidents of the homeland security incident hazard are nearly impossible to predict, vulnerabilities to new and future development will be difficult to determine. However, new and future development constructed near major highways or critical facilities and infrastructure would be more vulnerable to incidents of homeland security.

Data Limitations and Other Key Documents

The plan does not document history of homeland security hazard incidents in Barnes County. The rarity of the hazard and confidentiality limit the data that is available.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

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

Hazard Profile and History

No history was available pertaining to homeland security incidents in Barnes County. Oral history from county residents indicate that bomb and other security threats to public schools may have occurred over the past decade.

5.8 Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes

Characteristics

Summer storms are caused by atmospheric temperature imbalances. Thunderstorms develop as warm, moist air rises. These conditions will produce updraft and downdrafts that can reach velocities of 170 mph. Updrafts and downdrafts are the reason for gust fronts, heavy rain (flash flooding), lightning, hail, and high winds. Downburst or straight line winds can be as deadly as tornados. If a thunderstorm continues to intensify, a tornado may develop. A thunderstorm affects a relatively small area when compared to a winter storm. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Despite their small size, all thunderstorms are dangerous. Severe summer storms can result in loss of life, injuries, and damage to property and crops.

Downburst/Strong Winds/Straight-line Winds: A downburst is created by an area of significantly rain-cooled air that, after reaching ground level, spreads out in all directions producing strong winds. Unlike winds in a tornado, winds in a downburst are directed outwards from the point where it hits land or water. Dry downbursts are associated with thunderstorms with very little rain, while wet downbursts are created by thunderstorms with high amounts of rainfall. The number one cause of wind damage in North Dakota is from downburst winds, not tornados.

Straight-line winds cause the most thunderstorm wind damage. Straight-line winds are any winds not associated with the rotation of a tornado. Straight-line winds come in speeds that can exceed 125 mph.

Strong winds will occur outside of tornados and severe thunderstorms. The winds usually develop with strong pressure gradients and gusty frontal passages. Strong winds occur any time of year.

Extreme Heat: Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature. When the body heats too quickly to cool itself safely, or when you lose too much fluid or salt through dehydration or sweating, your body temperature rises and heat-related illness may develop.

As the days get warmer, State and Federal emergency management officials warn that extreme heat can be very dangerous and in some instances even fatal. Exposure to extreme heat can cause physical problems and may cause heat disorders or illnesses. Older adults, young children and those who are sick or overweight are most vulnerable to extreme heat. Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas.

Studies indicate that, other things being equal, the severity of heat disorders tends to increase with age. Conditions that cause heat cramps in a 17-year-old may result in heat exhaustion in someone 40-years old, and in heat stroke in a person over 60. Sunburn, with its ultraviolet radiation burns, can significantly hamper the skin's ability to shed excess heat. Acclimatization has to do with adjusting sweat-salt concentrations, among other things. The idea is to lose enough water to regulate body temperature, with the least possible chemical disturbance—salt depletion.

Each year, dozens of children left in parked vehicles die from hyperthermia. Hyperthermia is an acute condition that occurs when the body absorbs more heat than it can handle. Hyperthermia can occur even on a mild day. Studies have shown that the temperature inside a parked vehicle can rapidly rise to a dangerous level for children, pets and even adults. Leaving the windows slightly open does not significantly decrease the heating rate. The effects can be more severe in children because their bodies warm at a faster rate than adults.

The most common heat disorders are:

- Sunburn – Redness and pain, in severe cases swelling of skin, blisters, fever, headaches
- Heat Cramps – Painful spasms usually in the muscles of legs and abdomen with heavy sweating
- Heat Exhaustion – Heavy sweating, weakness, cold, pale, clammy skin, unsteady pulse, fainting, and vomiting, but may have normal temperature
- Heat Stroke (or Sunstroke) – High body temperature (106 degrees F or higher), hot dry skin, rapid and strong pulse, possible unconsciousness. Heat stroke is a severe medical emergency that can be life-threatening

During extremely hot weather, you should take the following precautions:

- Stay indoors as much as you can, on lower floors if possible
- Limit exposure to the sun and use sun block with a high sun protector factor rating (at least 15 spf) if you must be outdoors
- If your home does not have air conditioning, spend the hottest part of the day in public buildings such as libraries, schools, movie theaters, shopping malls, and other community facilities
- Use fans. Circulating air can cool the body by increasing the perspiration rate of evaporation.
- If you have window air conditioning, eliminate any holes or gaps around the installation.
- Check air-conditioning ducts for proper insulation
- Eat well-balanced, light, and regular meals. Avoid using salt tablets unless directed to do so by a physician.
- Drink plenty of water.
- Dress in loose-fitting, lightweight, and light-colored clothes that cover as much skin as possible.
- Protect your face and head by wearing a wide-brimmed hat.
- Check on family, friends, and neighbors who do not have air conditioning and who spend much of their time alone.
- Never leave children or pets alone in a closed vehicle
- Avoid strenuous work during the warmest part of the day, 11 a.m. to 4 p.m. Have a buddy system when working in extreme heat, and take frequent breaks.
- Exercise should be done in the early morning hours between 4-7 a.m.
- Make sure there is enough food and water for pets.

Livestock/animals and extreme heat: Extreme heat causes significant stress for all animals. Managing animals in high temperatures requires good forward planning. Water, shelter, and proper handling are important considerations during periods of extreme heat. Location of water should be familiar to animals

before days of extreme heat. Shelter should be provided if possible or an alternative such as shelterbelts. It is recommended not to handle animals in extreme heat unless absolutely necessary. Transportation of animals should be planned for early mornings.

Hail: Strong rising currents of air within a storm, called updraft, carry water droplets to a height where they freeze. Ice particles grow in size, becoming too heavy to be supported by the updraft, and fall to the ground as hail. Hail is larger than sleet and forms only in thunderstorms. Hail can be larger than a softball which is a 5 inch diameter. Hail tends to fall in swaths that range from 20 to 150 miles in length and 5 to 30 miles wide. Large hailstones can fall in speeds faster than 100 mph. The major hazard is to crops, aircraft, automobiles, roofs, and windows. Hail causes more than \$1 billion in crop and property damage each year. The destructiveness of hailstorms is not due to the hailstones alone. Hail damage is difficult to determine as hail, wind, and rain frequently occur at the same time.

Lightning: The rising air in a thunderstorm cloud causes various types of frozen precipitation to form within the cloud. Included in these precipitation types are very small ice crystals and much larger pellets of ice. The smaller ice crystals are carried upward towards the top of the clouds by the rising air while the heavier and denser pellets are either suspended by the rising air or start falling toward the ground. Collisions occur between the ice crystals and the pellets, and these collisions serve as the charging mechanism of the thunderstorm. The small ice crystals become positively charged while the pellets become negatively charged. At the same time, the ground underneath the cloud becomes charged oppositely of the charges directly overhead.

When the charge difference between the ground and the cloud becomes too large, a conductive channel of air develops between the cloud and the ground, and a small amount of charge (step leader) starts moving towards the ground. When it nears the ground, an upward leader of opposite charge connects with the step leader. At the instant this connection is made, a powerful discharge occurs between the cloud and the ground. We see this discharge as a bright visible flash of lightning.

The vast majority of lightning victims were going to a safe place, but waited too long before seeking shelter. More than 80% of lightning fatality victims are male, typically between the ages of 15 and 40. Lightning fatalities are most common during summer afternoons and evenings. The energy from one lightning flash could light a 100-watt light bulb for more than three months. Many wildfires are ignited by lightning.

The channel of air through which lightning passes can be heated to 50,000 F, hotter than the surface of the sun. The rapid heating and cooling of the air near the lightning channel causes a shockwave that results in the sound we know as thunder.

Almost all lightning deaths have occurred outdoors. In recent years, fatal activities have included:

- Boating
- Riding horse
- Riding on a lawn mower
- Golfing
- Walking

- Mountain climbing
- Camping
- Standing under a tree
- Swimming
- Playing sports
- Watching the storm
- Loading a truck
- Fishing
- Running to shelter

Tornados: Although tornados occur in many parts of the world, they are found most frequently in the United States. In an average year, 1,200 tornados cause 60-65 fatalities and 1,500 injuries nationwide. The peak time of the year that tornados occur is from the end of May through the beginning of August. As with thunderstorms that create them, tornados can form anytime day or night. The peak time, however, is during the evening hours from 6:00 to 8:00 p.m.

A tornado is a violently rotating column of air extending from a cumuliform cloud, such as a thunderstorm, to the ground. Tornados may appear nearly transparent until dust and debris are picked up or a cloud forms within the funnel. The average tornado moves from southwest to northeast, but tornados can move in any direction and can suddenly change their direction of motion. The average speed of a tornado is 30 mph but may vary from nearly stationary to 70 mph. The strongest tornados have rotating winds of more than 200 mph. The typical tornado is on the ground for less than ten minutes. However, tornados may only touchdown for one second and then go back up, or be on the ground for an hour or longer. Their funnel-shapes clouds can affect areas ranging from ¼ mile to a full mile wide and upward to 16 miles long. Extreme events have been known to travel over areas up to a mile wide and 300 miles long.

The National Weather Service uses the Enhanced Fujita Scale or EF-Scale to assign a tornado a rating based on estimated wind speeds and related damage.

Table 5.8.1 – Tornado Scale

| Enhanced Fujita Scale Rating | 3 Second Wind Gust (mph) | | |
|------------------------------|--------------------------|---|---------|
| 0 | 65 mph | - | 85 mph |
| 1 | 86 mph | - | 110 mph |
| 2 | 111 mph | - | 135 mph |
| 3 | 136 mph | - | 165 mph |
| 4 | 166 mph | - | 200 mph |
| 5 | 200+ mph | - | |

Source: National Weather Service

Before thunderstorms develop, winds change direction and increase in speed and altitude. This creates an invisible, horizontal spinning effect in the lower atmosphere. Rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical. An area of rotation, 2-6 miles wide, now extends through much of the storm. Most tornados form within this area of strong rotation.

Figure 5.8.1 Tornado Strengths



Weak Tornadoes

- 88% of all tornadoes
- Cause less than 5% of tornado deaths
- Lifetime 1-10+ minutes
- Winds less than 110 mph
- Produces EF0 or EF1 damages



Strong Tornadoes

- 11% of all tornadoes
- Cause nearly 30% of all tornado deaths
- May last 20 minutes or longer
- Winds 111-165 mph
- Produces EF2 or EF3 damage



Violent Tornadoes

- Less than 1% of all tornadoes
- Cause 70% of all tornado deaths
- Can exceed 1 hour
- Winds greater than 166 mph
- Produces EF4 or EF5 damage

Source: National Weather Service

The National Weather Service has a Doppler radar network strategically located across the country that can detect air movement toward or away from the radar. Early detection of increasing rotation aloft with in a thunderstorm can allow lifesaving warnings to be issued before a tornado forms.

Flying debris kills over 90 percent of all people killed by tornados. The winds of a tornado can reach extreme speeds, and at these speeds, neither man nor nature makes many things that can hold together. The one thing to remember about a tornado is that nothing can be done about them and they will go where they want. Get to a shelter immediately. With this in mind, the best place to go is underground, or as underground as possible to avoid wind and flying debris.

Figures showing largest recorded hail size, highest rated tornado, and strongest non-tornadic wind gust by North Dakota county can be found in the Hazard Profile and History section at the end of this chapter.

History

Barnes County has a documented hazard history that shows a 100 percent frequency and likelihood of the hazard occurring based on past occurrences. Approximately 232 occurrences of the hazards were recorded over a span of 66 years resulting in 6.50 injuries and one fatality. Property damage was approximately \$35.01 million and crop damage was \$139.10 million. Table 5.8.2 summarizes the history of severe summer weather occurrences in Barnes County. A detailed record of data history for severe summer weather be found in the Hazard Profile and History section at the end of this chapter, in addition to figures showing largest hail size, strongest wind gust, and largest tornado recorded.

Table 5.8.2 – 1948 to 2013 Barnes County Severe Summer Weather Summary

| Severe Summer Weather | | | | | | |
|-----------------------|------------|-------------|----------|------------|-----------------|---------------|
| Number of Occurrences | Date Range | Probability | Injuries | Fatalities | Property Damage | Crop Damage |
| 231 | 1948-2013 | 100% | 6.50 | 1.00 | \$35,013,677 | \$139,102,775 |

Sources: Spatial Hazard Events and Losses Database of the United States (SHELDUS)
 National Oceanic and Atmospheric Administration (NOAA)
 Information Service/National Climatic Data Center (NCDC)
 Barnes County MHMP 2010

Crop loss from severe summer weather is tracked by the United States Department of Agriculture Risk Management Agency (RMA). The RMA provides data on the crop type affected, net claimed acres, indemnity, loss liability, loss cost and the number of policies covered. The net claimed acres is the total acres planted for crops in the county for the given year. Liability is the total value in crops planted in the county for the given year. Indemnity is the amount paid to cover insurance claims from crop loss due to severe summer weather. The loss liability of crops totaled \$333,913,031 in Barnes County between 1990 and 2013 on 2,345,139 acres. Indemnity paid was \$202,148,886 resulting in losses of 61 percent of total liability. Crop loss indemnity paid from severe summer weather over the 24-year period resulted in an annual average of approximately \$8,422,870. Detailed data is available per crop for each year and can be found in Table 5.8.10.

Probability and Magnitude

Hazard history was gathered from NOAA, NCDC, SHELDUS, newspaper accounts, and the previous FEMA-approved Barnes County Mitigation Plan. This data covers a 66-year period from 1948 through 2013, and documents 231 notable severe summer weather occurrences, which equates to a probability of 100 percent, or guaranteed instances of severe summer weather each year. Total property damage was \$35,013,677 and average annual property damage was approximately \$530,000. Total crop damage was reported at \$139,102,775. The magnitude of the hazard ranges from large tornados and hail causing massive property damage, to heavy rain blocking roads. Data from the RMA on crop losses from severe summer weather resulted in an average annual indemnity of \$8,422,870.

Risk Assessment

Table 5.8.3 shows the risk assessment as determined by individual jurisdictions and the committee. The risk assessment methodology can be found on page 5-3 of Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 5.8.3 – Risk Assessment Summary Severe Summer Weather Scored Chart

| Severe Summer Weather | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|-----------------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 3 | 4 | 4 | 3 | 2 | 12 |
| Dazey | 3 | 2 | 3 | 3 | 2 | 9 |
| Fingal | 4 | 3 | 3 | 3 | 1 | 12 |
| Kathryn | 3 | 2 | 2 | 2 | 2 | 7 |
| Leal | 4 | 3 | 3 | 3 | 2 | 11 |
| Litchville | 3 | 3 | 4 | 3 | 1 | 12 |
| Nome | 4 | 3 | 3 | 4 | 1 | 13 |
| Oriska | 3 | 3 | 4 | 3 | 2 | 11 |
| Pillsbury | 2 | 4 | 3 | 2 | 1 | 10 |
| Rogers | 4 | 3 | 3 | 3 | 2 | 11 |
| Sanborn | 4 | 3 | 4 | 3 | 1 | 13 |
| Sibley | 4 | 2 | 3 | 4 | 1 | 12 |
| Valley City | 3 | 4 | 4 | 2 | 3 | 10 |
| Wimbledon | 3 | 3 | 3 | 3 | 2 | 10 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|------------------------|
| Seasonal Pattern | None |
| Duration | 24 hours |
| Speed of Onset | 12 to 16 hours warning |

Capabilities of and Vulnerabilities to Jurisdictions

According to the 2014 NDMHMP, Barnes County has a low-moderate vulnerability to tornados, hail, and thunderstorm winds, and moderate vulnerability to extreme heart and lightning. The county has an overall vulnerability raking of low-moderate to severe summer weather.

Capabilities of and vulnerabilities to jurisdictions were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|-------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of economy, livestock and crops • Increased fire danger from dry conditions and high winds • Downed trees and power lines • Structural damage to homes farmsteads • Strain to emergency services and responders if damage is widespread • Unpaved streets in small jurisdictions can become damaged from rainfall and moisture • Lightning strike to power pole and trees causing power outages • Heavy rains cause overland flooding damaging buildings and structures • Heavy rain causes shifting of soil potentially downing power lines • Possible displacement of an estimated 639 people based on an average household size of 2.29 people in 279 mobile home structures • A total of \$202,148,886 in crop loss between 1990 and 2013 • Approximately seven injuries and one death between 1960 and 2012 • Temporary economic boost due to rebuilding/repairs of homes, businesses and other structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Hazard occurs multiple times each year • Hail impacts areas of the county each year • Strong winds during summer months are commonplace • 156 occurrences between 1960 and 2012 resulting in 100 percent probability • Approximately \$8,422,870 in annual indemnity paid due to crop loss |
| Likelihood | 4 | <ul style="list-style-type: none"> • The hazard is part of the climate in the area • Strong storms and high wind are highly likely to occur in the future • Lack of storm water systems in some communities may contribute to overland flooding • 100 percent probability of hazards based on frequency of occurrences • Lightning strikes causing fires and other damages |

| | | |
|-----------------------------|----------|---|
| <p>Vulnerability</p> | <p>3</p> | <ul style="list-style-type: none"> • More vulnerable: 279 mobile homes structures consisting of five percent of the total housing stock • More vulnerable: 24 percent of population (2,632 people) is under the age of 20 and 20 percent consists of people over 65 (2,170 people) • More vulnerable: Location of small communities have experience prolonged response from emergency services • Less vulnerable: More advanced warning systems and reverse 911 • Less vulnerable: Increased communication, cell phones, internet and TV • Less vulnerable: Increase in technological capabilities of tractors and farm equipment warn farmers of severe storms • Less vulnerable: Emergency sirens are in place throughout the county • Less vulnerable: Education in schools has increased • Less vulnerable: Better predictions from the National Weather Service |
| <p>Capability</p> | <p>2</p> | <ul style="list-style-type: none"> • Active county commission • Contract for engineering, planning, and grant writing • GIS services provided by the state and county • Relies on county, state and other agencies for emergency assistance • Does not have financial resources to accomplish projects independently • County has county-wide mutual aid agreement for emergency services • Active emergency management department with education and outreach available on the department's website • Maintains capital improvements project list and project funding sources |

Vulnerabilities to County-Owned Buildings and Property

County-owned buildings are susceptible to severe summer weather in many forms. Buildings are often constructed to adequately withstand impacts from severe summer weather, but may not sustain high wind speeds, tornados or large hail. Large hail can damage building roofs, break windows and injure people. Depending on the size of the building and the role it plays in day-to-day operations, the vulnerability to severe summer weather can vary from nominal for larger structures such as the Barnes County Courthouse in Barnes to severe for county shops in smaller cities, which are considerably less sturdy. A summary of city and county owned buildings is provided in Chapter 4.

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities such as schools, college, water towers, roadways, county-owned buildings and other specialty facilities such as nursing homes and assisted living facilities are vulnerable to severe summer weather in a similar fashion to county-owned buildings and property. In terms of infrastructure, power lines are susceptible to wind and debris, which can disrupt service and cause power outages. Disruptions in water service can be caused by damage to water towers or lift stations. Roadways can become blocked due to windblown debris and limit access for emergency services.

Vulnerabilities of Critical Facilities and Infrastructure

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similar fashion to county-owned buildings and property. In terms of infrastructure, power lines are susceptible to wind and debris. This could disrupt service and cause power outages. Disruptions in water service can be caused by damage to water towers or lift stations. Roadways can become blocked due to windblown debris and limit access for emergency services.

Vulnerabilities to New and Future Development

Building codes ensure buildings and structures are built adequately to withstand most severe weather. The cities of Fingal, Kathryn, Leal, Nome, Oriska, Sanborn and Valley City have building codes and ordinances regulating building and development. The smaller cities of Dazey, Litchville, Pillsbury, Rogers, Sibley and Wimbledon lack building codes and do not have standards for new and future development. This lack puts these cities at more risk of damage and impacts from severe summer weather and windstorms. However, the city of Wimbledon has ordinances in place for trailer parks.

As populations grow, more people are at risk of injury and potential death from tornados, large hail and windblown debris such as tree branches. Strengthening of buildings codes would mitigate impacts from the hazard.

Data Limitations and Other Key Documents

Residents often experience impacts from these hazards, such as broken windows on homes or damage to vehicles, they do not report. Weather data provided by NOAA and other agencies can be incomplete. Fewer storm spotters reduce the amount of reported weather information.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

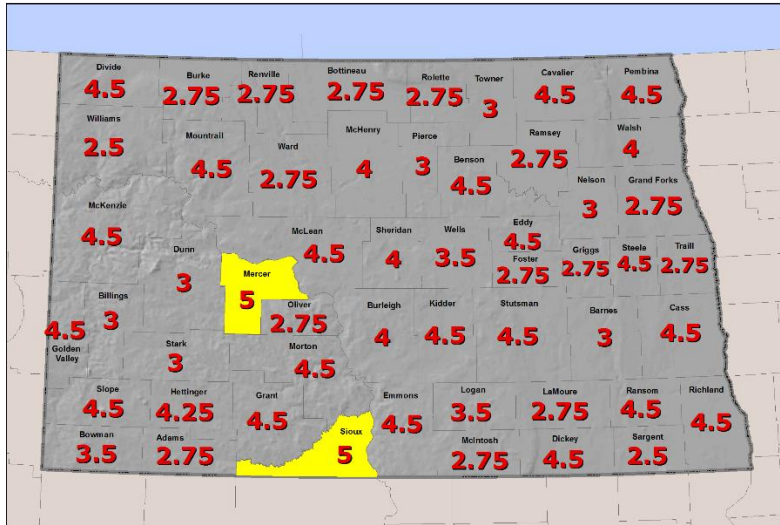
- North Dakota Emergency Operations Plan, Severe Storms Annex
- Barnes County Emergency Operations Plan
- Fingal Ordinances
- Kathryn Ordinances
- Leal Ordinances
- Nome Ordinances
- Sanborn Ordinances
- Valley City Ordinances
- Wimbledon Ordinances (trailer parks)
- North Dakota State Building Code
- North Dakota League of Cities: Planning and Zoning Handbook

Hazard Profile and History

Figures 5.8.2, 5.8.3, 5.8.4, and 5.8.5 provide information on largest hail size, highest rated tornado (F/EF), highest rated tornado (F), and strongest non-tornadic wind gust. Tables 5.8.4, 5.8.5, 5.8.6, 5.8.7, 5.8.8, and 5.8.9 provide details on excessive heat, funnel cloud, hail, heavy rain, thunderstorm-wind, and tornado events in Barnes County, respectively. Table 5.8.10 provides details on crop loss from the hazard

Figure 5.8.2 – Barnes County Largest Hail Size

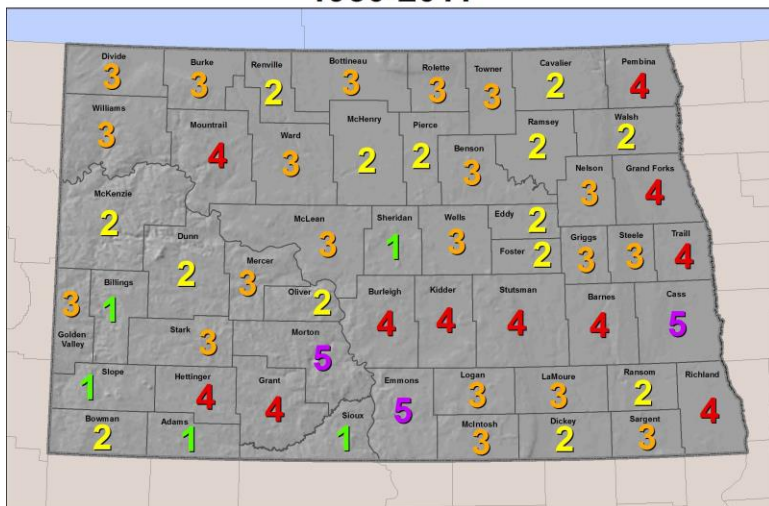
Largest Hail Size



Source: NOAA National Climatic Data Center

Figure 5.8.3 – 1950 to 2011 Barnes County Highest Rated Tornado (F/EF)

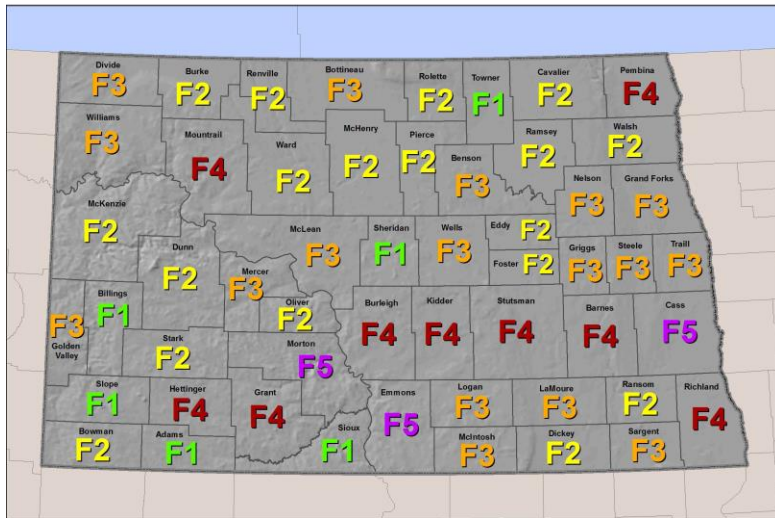
**Highest Rated Tornado (F/EF)
1950-2011**



Source: NOAA National Climatic Data Center

Figure 5.8.4 – 1950 to 2006 Barnes County Highest Rated Tornado (F)

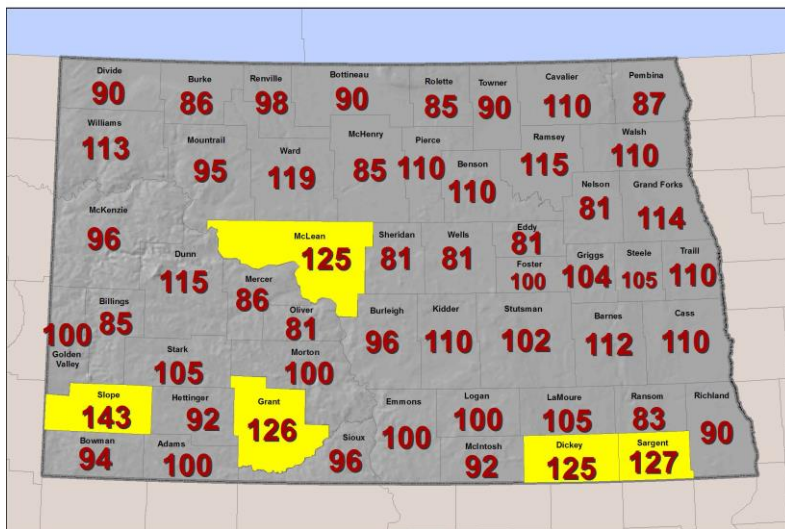
Highest Rated Tornado (F) 1950-2006



Source: NOAA National Climatic Data Center

Figure 5.8.5 – Strongest Non-Tornadoic Wind Gust

Strongest Non-Tornadoic Wind Gust



Source: NOAA National Climatic Data Center

Table 5.8.4 shows a detailed history of the hazard between 1960 and 2013 and was provided by the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Special Hazards Events and Losses Database for the United States (SHELDUS), and the 2010 Barnes County MHMP.

Table 5.8.4 – 2003 to 2013 Barnes County Excessive Heat Events

| Event | Excessive Heat |
|--------------------------|---|
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/16/2011 12:00:00 CST-6 |
| End Date | 07/20/2011 14:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A very unusual period of hot and humid weather settled over the northern plains. An upper level ridge set up across the nation's midsection, with thunderstorms firing almost continuously around the fringes of the ridge. This ring of fire scenario brought several bouts of severe weather to the area as well. Daytime highs generally rose into the 80s to low 90s with lows around 70. Dew point values generally peaked in the 70s to around 80, but slightly lower at night. At 7 pm on Tuesday (July 19), the temperature at Moorhead, Minnesota, peaked at 93F with a dew point of 88F, which gave it a heat index of 130. This generated a lot of media attention, as it was reported to be one of the hottest places on earth. In reality, siting and instrumentation characteristics may cast a little doubt on this reading. Despite this, it was undoubtedly a rare long duration heat event. |
| Event Narrative | |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.8.5 – 2003 to 2013 Barnes County Funnel Cloud Events

| Event | Funnel Cloud |
|--------------------------|--|
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/24/2010 14:43:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | E |
| Begin Location | NORTH VLY CITY |
| Begin Lat/Lon | 46.95/-97.96 |
| End Date | 05/24/2010 14:43:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | After the first round of elevated convection from the early morning hours of the 24th drifted off to the northeast, a surface warm front was left along the North Dakota and South Dakota border by mid-morning. By midafternoon of the 24th, the warm front had pushed north to a Jamestown (ND) to Bemidji |

| | |
|--------------------------|--|
| | (MN) line. Behind this front, afternoon temperatures had increased to around 90 degrees with dew points in the mid to upper 60s. High perceptible water values remained over eastern North Dakota and the northwest quarter of Minnesota, keeping the heavy rain threat in place throughout the day. |
| Event Narrative | A funnel extended nearly to the ground just north of exit 294 on Interstate 94, northeast of Valley City. |
| | |
| Event | Funnel Cloud |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 08/04/2011 16:35:00 CST-6 |
| Begin Range | 1 |
| Begin Azimuth | N |
| Begin Location | DAZEY |
| Begin Lat/Lon | 47.19/-98.2 |
| End Date | 08/04/2011 16:35:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | By the afternoon of the 4th, a weak surface boundary set up along a line from Roseau (MN) to Hillsboro to Valley City. Although there was fairly light surface convergence along this line, it did become fairly unstable. Just enough upper level support came along to generate scattered thunderstorms. |
| Event Narrative | The funnel lasted for two to three minutes. |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.8.6 – 2003 to 2013 Barnes County Hail Events

| Event | Hail |
|--------------------------|---|
| Magnitude | 1.00 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/18/2009 14:55:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | SE |
| Begin Location | NOME |
| Begin Lat/Lon | 46.63/-97.82 |
| End Date | 06/18/2009 14:55:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |

| | |
|-----------------------------|---|
| Episode Narrative | Eastern North Dakota remained in a very weak surface pattern on the 18th, with numerous weak surface lows and boundaries across the Midwest. Like the past several days, moisture levels remained very high, with surface dew points in the low to mid 60s. Some morning cloud cover along the North Dakota/South Dakota border lifted north by afternoon, and allowed a period of good heating. Although the upper level winds were fairly light, another in a series of upper level disturbances shifted over the area by midafternoon. This helped initiate thunderstorm development over southeast North Dakota and west central Minnesota. A cluster of thunderstorms also developed over extreme northeast North Dakota. By late afternoon, a line of thunderstorms raced across the Mooreton (ND) area, through Wahpeton/Breckenridge, and into the Fergus Falls (MN) area. This line of storms brought many reports of strong winds. The weak wind flow and moist atmosphere once again brought heavy rainfall to areas along the Canadian border and areas along and south of Interstate 94. |
| Event Narrative | The hail fell along the Ransom and Barnes County line. |
| Event | Hail |
| Magnitude | 0.88 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/05/2010 17:35:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | W |
| Begin Location | DAZEY |
| Begin Lat/Lon | 47.17/-98.29 |
| End Date | 06/05/2010 17:35:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Daytime heating and cold air aloft combined to produce quite a few showers and thunderstorms. A few of the thunderstorms dropped quarter sized hail. |
| Event Narrative | |
| Event | Hail |
| Magnitude | 1.00 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/05/2010 17:36:00 CST-6 |
| Begin Range | 5 |
| Begin Azimuth | W |
| Begin Location | DAZEY |
| Begin Lat/Lon | 47.19/-98.31 |

| | |
|-----------------------------|---|
| End Date | 06/05/2010 17:36:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Daytime heating and cold air aloft combined to produce quite a few showers and thunderstorms. A few of the thunderstorms dropped quarter sized hail. |
| Event Narrative | Dime to quarter sized hail fell and most was soft graupel. |
| | |
| Event | Hail |
| Magnitude | 1.50 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/13/2010 15:30:00 CST-6 |
| Begin Range | 6 |
| Begin Azimuth | NW |
| Begin Location | LITCHVILLE |
| Begin Lat/Lon | 46.71/-98.27 |
| End Date | 07/13/2010 15:30:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Thunderstorms formed along a weak convergent boundary separating southeast winds from south winds. Late afternoon temperatures topped out in the lower 80s with dew points in the low to mid 60s. |
| Event Narrative | |
| | |
| Event | Hail |
| Magnitude | 1.25 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/14/2010 03:45:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | W |
| Begin Location | NOME |
| Begin Lat/Lon | 46.68/-97.9 |
| End Date | 07/14/2010 03:47:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

| | |
|--------------------------|--|
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Unusually warm and humid air remained in place during the early morning hours of the 14th, especially along and south of the Interstate 94 corridor. Temperatures hovered in the lower 70s with dew point temperatures in the upper 60s to around 70. A line of thunderstorms moved east across southeast North Dakota into west central Minnesota, producing mainly strong wind gusts. |
| Event Narrative | This was the third severe thunderstorm to affect the area during a 12 hour period |
| | |
| Event | Hail |
| Magnitude | 1.00 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/20/2010 23:25:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | SW |
| Begin Location | LUCCA |
| Begin Lat/Lon | 46.68/-97.82 |
| End Date | 07/20/2010 23:25:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Showers and thunderstorms over north central North Dakota moved southeast across southwest Benson and northwest Eddy counties late in the evening of the 20th before weakening. Several hours later, another storm fired up over southeast Barnes and north central Ransom county. There was very little surface convergence to work with, but there was a fairly potent upper level disturbance moving through. |
| Event Narrative | The hail destroyed a personal garden. |
| | |
| Event | Hail |
| Magnitude | 2.75 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/17/2011 15:15:00 CST-6 |
| Begin Range | 5 |
| Begin Azimuth | S |
| Begin Location | PILLSBURY |
| Begin Lat/Lon | 47.13/-97.8 |
| End Date | 07/17/2011 15:15:00 CST-6 |

| | |
|-----------------------------|---|
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Early in the afternoon of the 17th, one supercell tracked across extreme southwest Benson county, down through western Eddy county, and into Griggs county. This cell maintained a very slow southeast movement along its entire track. The supercell fed off an extremely unstable atmosphere, with surface temperatures in the 80s and 90s and dew point readings in the mid to upper 70s. By late afternoon into the early evening, more storms broke out along and south of the Interstate 94 corridor. |
| Event Narrative | |
| Event | Hail |
| Magnitude | 0.75 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/23/2011 01:00:00 CST-6 |
| Begin Range | 1 |
| Begin Azimuth | NW |
| Begin Location | LITCHVILLE |
| Begin Lat/Lon | 46.66/-98.19 |
| End Date | 07/23/2011 01:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Early in the morning of the 23rd, a squall line moved from central North Dakota, across the Fargo Moorhead area, and into portions of west central Minnesota. It was another warm and muggy night, with dew points still in the low 70s across southeast North Dakota and west central Minnesota. This set up a good instability and moisture gradient from Bismarck (ND) to Aberdeen (SD) into west central Minnesota. The main storm complex was aided by the low level jet, which also focused along the instability gradient. Most of the severe reports came from strong wind gusts. |
| Event Narrative | Wind speeds were estimated at 40 to 50 mph with torrential rain. |
| Event | Hail |
| Magnitude | 1.00 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |

| | |
|-----------------------------|--|
| Begin Date | 07/31/2011 21:15:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NW |
| Begin Location | EASTEDGE |
| Begin Lat/Lon | 46.67/-97.95 |
| End Date | 07/31/2011 21:15:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Severe thunderstorms from central North Dakota moved into eastern North Dakota late on the evening of the 31st. Many of these storms showed a bow structure, or a structure indicative of strong winds. The storms were also slow movers and several rounds of them tracked over the same area. Hope, ND, was hit by both strong winds and very heavy rainfall. Damaging wind gusts were reported from Hope all the way through northern Richland County (ND). The storms crossed the Red River and produced more wind damage across northern Wilkin County (MN). The storms continued into the early morning hours of August 1st. |
| Event Narrative | |
| | |
| Event | Hail |
| Magnitude | 0.88 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/22/2012 20:30:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | W |
| Begin Location | LITCHVILLE |
| Begin Lat/Lon | 46.65/-98.22 |
| End Date | 05/22/2012 20:30:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | A cold front pushed east across North Dakota late in the evening of the 22nd. As of 9 pm CST, the cold front had moved into central North Dakota with another stationary boundary extending from the Turtle Mountains to the U. S. Highway 2 corridor in Minnesota. As the low level jet intensified in the evening, a cluster of thunderstorms moved into south central and southeast North Dakota. This cluster of storms moved north-northeast through the late evening and produced several severe thunderstorms. |

| | |
|-----------------------------|---|
| Event Narrative | |
| | |
| Event | Hail |
| Magnitude | 1.00 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/22/2012 22:15:00 CST-6 |
| Begin Range | 3 |
| Begin Azimuth | ENE |
| Begin Location | LEAL |
| Begin Lat/Lon | 47.11/-98.25 |
| End Date | 05/22/2012 22:15:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A cold front pushed east across North Dakota late in the evening of the 22nd. As of 9 pm CST, the cold front had moved into central North Dakota with another stationary boundary extending from the Turtle Mountains to the U. S. Highway 2 corridor in Minnesota. As the low level jet intensified in the evening, a cluster of thunderstorms moved into south central and southeast North Dakota. This cluster of storms moved north-northeast through the late evening and produced several severe thunderstorms. |
| Event Narrative | Quarter size hail fell along with some smaller hailstones. |
| | |
| Event | Hail |
| Magnitude | 1.00 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/14/2012 04:05:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | S |
| Begin Location | LUCCA |
| Begin Lat/Lon | 46.64/-97.79 |
| End Date | 06/14/2012 04:05:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |

| | |
|--------------------------|---|
| Episode Narrative | A few severe thunderstorms occurred over portions of eastern North Dakota during the early morning hours of June 14th. |
| Event Narrative | A few dime to quarter size hail fell with brief strong winds. |
| | |
| Event | Hail |
| Magnitude | 1.25 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/24/2012 22:10:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | W |
| Begin Location | EASTEDGE |
| Begin Lat/Lon | 46.65/-98.01 |
| End Date | 07/24/2012 22:10:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Two distinct areas of thunderstorms developed across eastern North Dakota and the northwest quarter of Minnesota during the late evening of July 24th into the early morning of the 25th. The first ran along the U. S. Highway 2 corridor from Devils Lake to Grand Forks to Fosston, while the second ran along and just south of the Interstate 94 corridor from Kathryn to Kindred to Barnesville. Roughly one to two inches of rain fell along the U. S. Highway 2 corridor while three to six inches of rain fell along the Interstate 94 corridor. Since the area was in the middle of a D2 drought, per the U. S. Drought Monitor, the rain did not have a big effect on area rivers. Most of the severe weather occurred along the Interstate 94 corridor, with some large hail and strong winds gusts reported. |
| Event Narrative | Penny to walnut sized hail fell along with very heavy rain across southern Oak Hill Township. Some smaller hail had fallen roughly a half hour earlier. |
| | |
| Event | Hail |
| Magnitude | 0.75 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/29/2012 19:27:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | VALLEY CITY |
| Begin Lat/Lon | 46.92/-98.01 |
| End Date | 07/29/2012 19:27:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

| | |
|--------------------------|---|
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A thunderstorm complex over southern Manitoba moved southeast during the evening of July 29th, eventually affecting areas around the Lake of the Woods with some large hail. A few other thunderstorms also fired up along the surface boundary, which by sunset extended from the Lake of the Woods to Grand Forks/East Grand Forks to near Valley City. |
| Event Narrative | |
| Event | Hail |
| Magnitude | 0.75 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/29/2012 19:58:00 CST-6 |
| Begin Range | 3 |
| Begin Azimuth | SSW |
| Begin Location | BEREA |
| Begin Lat/Lon | 46.89/-98.12 |
| End Date | 07/29/2012 19:58:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A thunderstorm complex over southern Manitoba moved southeast during the evening of July 29th, eventually affecting areas around the Lake of the Woods with some large hail. A few other thunderstorms also fired up along the surface boundary, which by sunset extended from the Lake of the Woods to Grand Forks/East Grand Forks to near Valley City. |
| Event Narrative | |
| Event | Hail |
| Magnitude | 1.00 in. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/29/2012 20:30:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NW |
| Begin Location | NOME |
| Begin Lat/Lon | 46.7/-97.89 |
| End Date | 07/29/2012 20:30:00 CST-6 |

| | |
|-----------------------------|---|
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A thunderstorm complex over southern Manitoba moved southeast during the evening of July 29th, eventually affecting areas around the Lake of the Woods with some large hail. A few other thunderstorms also fired up along the surface boundary, which by sunset extended from the Lake of the Woods to Grand Forks/East Grand Forks to near Valley City. |
| Event Narrative | |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.8.7 – 2003 to 2013 Barnes County Heavy Rain Events

| | |
|-----------------------------|--|
| Event | Heavy Rain |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/15/2011 03:30:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | VALLEY CITY |
| Begin Lat/Lon | 46.92/-98.01 |
| End Date | 07/15/2011 05:30:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | The combination of upper and lower jet support led to some nocturnal thunderstorms across southeast North Dakota and west central Minnesota. |
| Event Narrative | Some minor street flooding occurred in Valley City. |
| | |
| Event | Heavy Rain |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/15/2011 06:00:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | WIMBLEDON |
| Begin Lat/Lon | 47.17/-98.46 |
| End Date | 07/15/2011 06:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

| | |
|-----------------------------|--|
| Injuries Direct/Indirect | 0/0 |
| Crop Damage | |
| Episode Narrative | The combination of upper and lower jet support led to some nocturnal thunderstorms across southeast North Dakota and west central Minnesota. |
| Event Narrative | An observer measured 2.80 inches of rain over the past 24 hours. |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.8.8 – 2003 to 2013 Barnes County Thunderstorm-Wind Events

| | |
|-----------------------------|--|
| Event | Thunderstorm Wind |
| Magnitude | 55 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/17/2010 06:30:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | VALLEY CITY |
| Begin Lat/Lon | 46.92/-98.01 |
| End Date | 06/17/2010 06:30:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A low level jet helped fuel elevated thunderstorms along the Interstate 94 corridor in the morning. A few thunderstorms continued into the early afternoon, but by then they had lifted north to the U. S. Highway 2 corridor. |
| Event Narrative | Large tree limbs were blown down in the northern part of town. |
| | |
| Event | Thunderstorm Wind |
| Magnitude | 52 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/22/2010 03:15:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | N |
| Begin Location | ROGERS |
| Begin Lat/Lon | 47.1/-98.2 |
| End Date | 06/22/2010 03:15:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |

| | |
|--------------------------|---|
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A mesoscale convective system (MCS) formed over western North Dakota after midnight and tracked east across the state in the early morning hours of the 22nd. The line of thunderstorms bowed out at times and produced sporadic higher wind gusts. Some hail was also reported before the storms weakened over southeast North Dakota. |
| Event Narrative | Several large tree branches and tree limbs were blown down. A sliding door was blown off a grainery. |
| | |
| Event | Thunderstorm Wind |
| Magnitude | 52 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/25/2010 03:04:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | VALLEY CITY |
| Begin Lat/Lon | 46.92/-98.01 |
| End Date | 06/25/2010 03:04:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A mesoscale convective system moved along the Interstate 94 corridor in the early morning hours of the 25th, producing a few reports of damage. |
| Event Narrative | |
| | |
| Event | Thunderstorm Wind |
| Magnitude | 61 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/14/2010 02:35:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | N |
| Begin Location | KATHRYN |
| Begin Lat/Lon | 46.73/-97.77 |
| End Date | 07/14/2010 02:38:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |

| | |
|--------------------------|---|
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Unusually warm and humid air remained in place during the early morning hours of the 14th, especially along and south of the Interstate 94 corridor. Temperatures hovered in the lower 70s with dew point temperatures in the upper 60s to around 70. A line of thunderstorms moved east across southeast North Dakota into west central Minnesota, producing mainly strong wind gusts. |
| Event Narrative | Numerous large tree limbs were broken down around the community |
| | |
| Event | Thunderstorm Wind |
| Magnitude | 87 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/26/2010 23:25:00 CST-6 |
| Begin Range | 3 |
| Begin Azimuth | ENE |
| Begin Location | SIBLEY |
| Begin Lat/Lon | 47.22/-97.87 |
| End Date | 07/26/2010 23:35:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 1.00M |
| Episode Narrative | Warm mid-level temperatures held back convection until the mid-evening of the 26th, when a line of thunderstorms flared up north of Devils Lake. As these thunderstorms moved east, they began to bow and produce strong straight line winds at the surface. Just before midnight, thunderstorms to the south of the initial line strengthened and also produced sporadic reports of strong winds from south of Cooperstown down through the Fargo/Moorhead area and into portions of west central Minnesota. There was a bit of a lull in the early morning from severe storms, but another strong line fired up again by midafternoon. However, by this time, most of the strongest storms were over Grant County and areas further south and east. The Highway 10 corridor from Barnesville to Perham to Sebeka was hit by several rounds of thunderstorms and heavy rain, which resulted in flash flooding. |
| Event Narrative | Widespread downburst wind damage was noted across northeast Barnes County and into adjacent portions of southwest Steele County and southeast Griggs County. Significant crop and tree damage occurred across Baldwin Township which indicated peak wind speeds of from 90 to 100 mph. This damage is separate from concurrent and adjacent tornado damage. |
| | |
| Event | Thunderstorm Wind |
| Magnitude | 60 kts. |
| State | NORTH DAKOTA |

| | |
|-----------------------------|---|
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/27/2010 02:45:00 CST-6 |
| Begin Range | 5 |
| Begin Azimuth | NNE |
| Begin Location | DAZEY BRYN ARPT |
| Begin Lat/Lon | 47.24/-98.12 |
| End Date | 07/27/2010 02:45:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Warm mid-level temperatures held back convection until the mid-evening of the 26th, when a line of thunderstorms flared up north of Devils Lake. As these thunderstorms moved east, they began to bow and produce strong straight line winds at the surface. Just before midnight, thunderstorms to the south of the initial line strengthened and also produced sporadic reports of strong winds from south of Cooperstown down through the Fargo/Moorhead area and into portions of west central Minnesota. There was a bit of a lull in the early morning from severe storms, but another strong line fired up again by midafternoon. However, by this time, most of the strongest storms were over Grant County and areas further south and east. The Highway 10 corridor from Barnesville to Perham to Sebeka was hit by several rounds of thunderstorms and heavy rain, which resulted in flash flooding. |
| Event Narrative | Damage occurred along the Barnes and Griggs county line. |
| | |
| Event | Thunderstorm Wind |
| Magnitude | 50 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/15/2011 02:15:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | WIMBLEDON |
| Begin Lat/Lon | 47.17/-98.46 |
| End Date | 07/15/2011 02:15:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | The combination of upper and lower jet support led to some nocturnal thunderstorms across southeast North Dakota and west central Minnesota. |

| | |
|-----------------------------|---|
| Event Narrative | Numerous 3 to 4 inch diameter tree branches were blown down around town. |
| Event | Thunderstorm Wind |
| Magnitude | 55 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/15/2011 02:45:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | VALLEY CITY |
| Begin Lat/Lon | 46.92/-98.01 |
| End Date | 07/15/2011 02:45:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | The combination of upper and lower jet support led to some nocturnal thunderstorms across southeast North Dakota and west central Minnesota. |
| Event Narrative | Many tree branches and power lines were blown down. |
| Event | Thunderstorm Wind |
| Magnitude | 50 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/23/2011 01:25:00 CST-6 |
| Begin Range | 6 |
| Begin Azimuth | NNW |
| Begin Location | NORTH VLY CITY |
| Begin Lat/Lon | 47.03/-98.06 |
| End Date | 07/23/2011 01:25:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Early in the morning of the 23rd, a squall line moved from central North Dakota, across the Fargo Moorhead area, and into portions of west central Minnesota. It was another warm and muggy night, with dew points still in the low 70s across southeast North Dakota and west central Minnesota. This set up a good instability and moisture gradient from Bismarck (ND) to Aberdeen (SD) into west central Minnesota. The main storm complex was aided by the low level jet, which also |

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| | focused along the instability gradient. Most of the severe reports came from strong wind gusts. |
| Event Narrative | A few large three to five inch diameter tree branches and tree limbs were broken down by strong winds at a campground. |
| | |
| Event | Thunderstorm Wind |
| Magnitude | 58 kts. |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 08/01/2011 02:04:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NW |
| Begin Location | PILLSBURY |
| Begin Lat/Lon | 47.22/-97.8 |
| End Date | 08/01/2011 02:04:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | This episode began late in the evening of July 31st and continued into the early morning hours of August 1st, as severe thunderstorms from central North Dakota moved into eastern North Dakota. Many of these storms showed a bow structure, or a structure indicative of strong winds. The storms were also slow movers and several rounds of them tracked over the same area. Hope, ND, was hit by both strong winds and very heavy rainfall. Damaging wind gusts were reported from Hope all the way through northern Richland County (ND). The storms crossed the Red River and produced more wind damage across northern Wilkin County (MN). |
| Event Narrative | The wind gust was measured at a NDAWN mesonet site. |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.8.9– 2003 to 2013 Barnes County Tornado Events

| | |
|----------------|---------------------------|
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 0.1 |
| -- Width | 10 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/24/2010 14:29:00 CST-6 |
| Begin Range | 5 |
| Begin Azimuth | SSE |
| Begin Location | VALLEY CITY |
| Begin Lat/Lon | 46.85/-97.96 |
| End Date | 05/24/2010 14:29:00 CST-6 |

| | |
|-----------------------------|---|
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | After the first round of elevated convection from the early morning hours of the 24th drifted off to the northeast, a surface warm front was left along the North Dakota and South Dakota border by mid-morning. By midafternoon of the 24th, the warm front had pushed north to a Jamestown (ND) to Bemidji (MN) line. Behind this front, afternoon temperatures had increased to around 90 degrees with dew points in the mid to upper 60s. High perceptible water values remained over eastern North Dakota and the northwest quarter of Minnesota, keeping the heavy rain threat in place throughout the day. |
| Event Narrative | A persistent funnel tracked just to the east of Valley City. A brief touchdown and debris cloud were viewed by employees at a city business while the funnel was still south of Interstate 94. No damage was reported as the touchdown occurred over an open field. Peak winds were estimated at 75 mph. |
| | |
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 2.76 |
| -- Width | 25 |
| State | NORTH DAKOTA |
| County/Area | STUTSMAN |
| WFO | BIS |
| Begin Date | 06/17/2010 13:55:00 CST-6 |
| Begin Range | 11 |
| Begin Azimuth | NNE |
| Begin Location | STREETER |
| Begin Lat/Lon | 46.8/-99.26 |
| End Date | 06/17/2010 14:03:00 CST-6 |
| End Range | 5 |
| End Azimuth | SE |
| End Location | MEDINA |
| End Lat/Lon | 46.83/-99.23 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | Downstream of a strong upper level short wave trough, atmospheric destabilization was occurring late Thursday morning across much of west and central North Dakota in the wake of earlier thunderstorms, along with large scale ascent ahead of the trough resulting in surface low pressure deepening over southwest North Dakota. |

| | |
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| | <p>Tornado Watch number 333 was issued for much of west and all of central North Dakota early in the afternoon of Thursday, June 17th, due to ongoing severe convection and for the expected increase in storm coverage and severity. Storms rapidly intensified throughout the afternoon as large scale ascent and deep layer wind shear increased across the region, and as the surface low lifted northward towards Canada.</p> <p>Multiple severe thunderstorm and tornado warnings were issued during this event. Two flash flood warnings were issued as well. Numerous reports of large hail, severe thunderstorm winds, and heavy rain were received. More importantly, communication with local officials confirmed there were four tornado touchdowns, one of which resulted in minor damage in the city of Hettinger.</p> |
| Event Narrative | This tornado touched down in rural Stutsman County. There were no reports of damage. |
| | |
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 0.4 |
| -- Width | 25 |
| State | NORTH DAKOTA |
| County/Area | STUTSMAN |
| WFO | BIS |
| Begin Date | 06/17/2010 14:44:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | NE |
| Begin Location | PINGREE |
| Begin Lat/Lon | 47.19/-98.89 |
| End Date | 06/17/2010 14:47:00 CST-6 |
| End Range | 2 |
| End Azimuth | NE |
| End Location | PINGREE |
| End Lat/Lon | 47.19/-98.88 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | <p>Downstream of a strong upper level short wave trough, atmospheric destabilization was occurring late Thursday morning across much of west and central North Dakota in the wake of earlier thunderstorms, along with large scale ascent ahead of the trough resulting in surface low pressure deepening over southwest North Dakota. Tornado Watch number 333 was issued for much of west and all of central North Dakota early in the afternoon of Thursday, June 17th, due to ongoing severe convection and for the expected increase in storm coverage and severity. Storms rapidly intensified throughout the afternoon as large scale ascent and deep layer wind shear increased across the region, and as the surface low lifted northward towards Canada.</p> |

| | |
|-----------------------------|---|
| | Multiple severe thunderstorm and tornado warnings were issued during this event. Two flash flood warnings were issued as well. Numerous reports of large hail, severe thunderstorm winds, and heavy rain were received. More importantly, communication with local officials confirmed there were four tornado touchdowns, one of which resulted in minor damage in the city of Hettinger. |
| Event Narrative | A brief tornado touchdown occurred in rural Stutsman County. No damage reports were received. |
| | |
| Event | Tornado |
| -- Scale | EF1 |
| -- Length | 1 |
| -- Width | 100 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/17/2010 15:01:00 CST-6 |
| Begin Range | 6 |
| Begin Azimuth | N |
| Begin Location | BEREA |
| Begin Lat/Lon | 47.01/-98.11 |
| End Date | 06/17/2010 15:03:00 CST-6 |
| End Range | 5 |
| End Azimuth | SE |
| End Location | ROGERS |
| End Lat/Lon | 47.02/-98.11 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Conditions were ripe by the afternoon of the 17th for a major severe weather outbreak. A surface low had moved into east central North Dakota with an occluded front extending to the southeast. Warm and humid air was in place ahead of the front, with a much drier air mass pushing in behind it. The 500mb low was located over northwest North Dakota with a nice southwest to northeast upper jet pushing into eastern North Dakota. Two lines of convection formed by late afternoon, one from Roseau County down toward Eastern Otter Tail County and the other over east central North Dakota. Nearly all the cells that formed took on a classic hook shape with rotation very evident on radar imagery. Multiple tornado warnings were issued before the event wound down by mid-evening. The strongest tornadoes were determined to be EF4 tornadoes, two in west central Minnesota and one in northeast North Dakota. |
| Event Narrative | The tornado tracked northward for about a mile to about 1 mile west-southwest of the Baldhill Dam. The tornado snapped a wooden power pole, knocked down several poplar trees, and shredded a portion of an old corn field. Peak winds were estimated at 100 mph. |

| | |
|-----------------------------|---|
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 0.2 |
| -- Width | 15 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/17/2010 15:05:00 CST-6 |
| Begin Range | 2 |
| Begin Azimuth | WSW |
| Begin Location | DAZEY |
| Begin Lat/Lon | 47.17/-98.23 |
| End Date | 06/17/2010 15:05:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | Conditions were ripe by the afternoon of the 17th for a major severe weather outbreak. A surface low had moved into east central North Dakota with an occluded front extending to the southeast. Warm and humid air was in place ahead of the front, with a much drier air mass pushing in behind it. The 500mb low was located over northwest North Dakota with a nice southwest to northeast upper jet pushing into eastern North Dakota. Two lines of convection formed by late afternoon, one from Roseau County down toward Eastern Otter Tail County and the other over east central North Dakota. Nearly all the cells that formed took on a classic hook shape with rotation very evident on radar imagery. Multiple tornado warnings were issued before the event wound down by mid-evening. The strongest tornadoes were determined to be EF4 tornadoes, two in west central Minnesota and one in northeast North Dakota. |
| Event Narrative | Multiple funnel clouds were viewed to the west, southwest, and south of Dazey, all moving northward. One produced a brief touchdown in an open field near Dazey, though no damage was observed. Peak winds were estimated at 80 mph. |
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 0.8 |
| -- Width | 50 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/13/2010 16:38:00 CST-6 |
| Begin Range | 3 |
| Begin Azimuth | SW |
| Begin Location | LUCCA ARPT |

| | |
|-----------------------------|---|
| Begin Lat/Lon | 46.68/-97.75 |
| End Date | 07/13/2010 16:40:00 CST-6 |
| End Range | 2 |
| End Azimuth | SW |
| End Location | LUCCA ARPT |
| End Lat/Lon | 46.67/-97.73 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Thunderstorms formed along a weak convergent boundary separating southeast winds from south winds. Late afternoon temperatures topped out in the lower 80s with dew points in the low to mid 60s. |
| Event Narrative | A persistent wall cloud with multiple funnels was viewed passing east of Nome. One or more of the funnels touched down briefly in mainly opened fields. |
| | |
| Event | Tornado |
| -- Scale | EF2 |
| -- Length | 13.77 |
| -- Width | 500 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/26/2010 23:30:00 CST-6 |
| Begin Range | 1 |
| Begin Azimuth | E |
| Begin Location | SIBLEY |
| Begin Lat/Lon | 47.2/-97.91 |
| End Date | 07/26/2010 23:59:00 CST-6 |
| End Range | 9 |
| End Azimuth | SE |
| End Location | PILLSBURY |
| End Lat/Lon | 47.09/-97.66 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 1.00M |
| Crop Damage | 250.00K |
| Episode Narrative | Warm mid-level temperatures held back convection until the mid-evening of the 26th, when a line of thunderstorms flared up north of Devils Lake. As these thunderstorms moved east, they began to bow and produce strong straight line winds at the surface. Just before midnight, thunderstorms to the south of the initial line strengthened and also produced sporadic reports of strong winds from south of |

| | |
|-----------------------------|---|
| | Cooperstown down through the Fargo/Moorhead area and into portions of west central Minnesota. There was a bit of a lull in the early morning from severe storms, but another strong line fired up again by midafternoon. However, by this time, most of the strongest storms were over Grant County and areas further south and east. The Highway 10 corridor from Barnesville to Perham to Sebeka was hit by several rounds of thunderstorms and heavy rain, which resulted in flash flooding. |
| Event Narrative | Several grain bins were lofted for a mile or more and destroyed. Large pine trees were uprooted and numerous trees were stripped of leaves and branches. Equipment storage buildings were unroofed and otherwise flattened to the ground. The tornado tracked continuously for at 14 to 15 miles. There was also widespread wind and hail damage observed in the area. |
| | |
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 4 |
| -- Width | 20 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/27/2011 15:50:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | N |
| Begin Location | NORTH VLY CITY |
| Begin Lat/Lon | 47.01/-98.01 |
| End Date | 05/27/2011 16:05:00 CST-6 |
| End Range | 10 |
| End Azimuth | NNE |
| End Location | VALLEY CITY |
| End Lat/Lon | 47.05/-97.92 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A frontal boundary extended along a line from Langdon to Lisbon late in the afternoon of the 27th. With afternoon heating, strong instability developed across eastern North Dakota. One thunderstorm cell produced a tornado that touched down twice. |
| Event Narrative | Law enforcement observed this tornado as it tracked intermittently along a roughly 4 mile track. The wall cloud structure and storm continued northeastward and produced at least one additional brief tornado. Peak winds were estimated at 75 mph. |
| | |
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 0.5 |

| | |
|-----------------------------|--|
| -- Width | 20 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 05/27/2011 16:17:00 CST-6 |
| Begin Range | 4 |
| Begin Azimuth | SE |
| Begin Location | SIBLEY |
| Begin Lat/Lon | 47.16/-97.88 |
| End Date | 05/27/2011 16:18:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A frontal boundary extended along a line from Langdon to Lisbon late in the afternoon of the 27th. With afternoon heating, strong instability developed across eastern North Dakota. One thunderstorm cell produced a tornado that touched down twice. |
| Event Narrative | A persistent wall cloud and funnel tracked northeast from the Baldhill Dam area and produced multiple brief touchdowns along its path. Peak winds were estimated at 70 mph. |
| | |
| Event | Tornado |
| -- Scale | EF1 |
| -- Length | 3 |
| -- Width | 100 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 07/15/2011 02:40:00 CST-6 |
| Begin Range | 0 |
| Begin Azimuth | W |
| Begin Location | VALLEY CITY ARPT |
| Begin Lat/Lon | 46.93/-98.03 |
| End Date | 07/15/2011 02:46:00 CST-6 |
| End Range | 1 |
| End Azimuth | E |
| End Location | VALLEY CITY |
| End Lat/Lon | 46.92/-97.98 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 750.00K |

| | |
|--------------------------|---|
| Crop Damage | 250.00K |
| Episode Narrative | The combination of upper and lower jet support led to some nocturnal thunderstorms across southeast North Dakota and west central Minnesota. |
| Event Narrative | A tornado was briefly viewed wrapped in heavy rains as it approached the northeast corner of Valley City. The tornado became entirely wrapped in heavy rains and downburst winds as it tracked for about three miles across northern portions of Valley City. Numerous large tree limbs and branches were broken down around town. Peak winds were estimated at 95 mph. The downburst winds affected a much wider path. |
| | |
| Event | Tornado |
| -- Scale | EF0 |
| -- Length | 0.24 |
| -- Width | 20 |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 06/03/2012 18:16:00 CST-6 |
| Begin Range | 1 |
| Begin Azimuth | W |
| Begin Location | NORTH VLY CITY |
| Begin Lat/Lon | 46.95/-98.02 |
| End Date | 06/03/2012 18:17:00 CST-6 |
| End Range | 1 |
| End Azimuth | W |
| End Location | NORTH VLY CITY |
| End Lat/Lon | 46.95/-98.02 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | By early in the evening of June 3rd, a surface boundary had crept into the Red River Valley. Dew point values, which had held in the 50s for much of the day, managed to rise into the low to mid 60s right along the boundary. Showers and thunderstorms fired up early in the evening along the boundary, producing tornado and funnel reports. |
| Event Narrative | This tornado appeared to have started as a ground based dust devil which grew vertically into a land spout but dissipated fairly quickly. The path occurred over open fields and peak winds were estimated at 65 mph. |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

The following narratives were included in the 2010 Barnes County MHMP. The narratives describe detailed events of severe summer weather in Barnes County.

Summer 1948, Heavy rain near Kathryn caused the Sheyenne River to actually flow backward for a time and caused severe flooding of bottomland along the river.

July 13, 1993, Seven or more inches of rain fell on saturated ground in two hours. A flash flood resulted with water pouring off the hills into Valley City and low lying rural areas. This caused dike failures, basement and first floor flooding, street and public building damage, culvert and bridge washouts, and ended up with 80 percent of the basements in the county becoming working wells. This storm caused over \$5,000,000 in FEMA paid damage, and at least \$3,000,000 more that was not covered by insurance or FEMA. At least 400 sites were damaged in the county and township road system. Ag damage was at \$50,000,000 or more.

July 3, 1994, Heavy rains occurred in most of eastern North Dakota and parts of central and western North Dakota. Due to heavy rains on top of already saturated soil, 25 counties in North Dakota have been declared Presidential disaster areas. Many of these counties had July rainfall of four to nearly ten inches, which was on top of June's four to seven inches. July's average precipitation is from two to three inches. Damage occurred to basements, roads, bridges, and septic systems. There were 200 road sites damaged in Barnes County affected. Grand Forks saw 1000 to 1200 homes and businesses were damaged at a cost of \$2,000,000. In Richland and Traill Counties over 200,000 acres of farmland were damaged. Property damage as a result of this storm is estimated at \$500,000 in Barnes County. Crop damage as a result of this storm is estimated at \$50,000,000. Rains flooded "Frog Town" the NE section of Valley City.

May 8, 2004, 11:05 PM CST – May 9, 2004, 11:05 PM CST

Magnitude of hail reported 6 miles west, northwest of Oriska, ND at 0.75 inches.

May 31, 2004, 10:35 AM CST – June 2, 2004, 3:00 PM CST

Convective rainfall over southeast North Dakota transitioned to a band of persistent wraparound rainfall from north of Devils Lake to southeast ND. The rain began in southeast ND on the 29th and continued into the day on the 31st. The rain over east central and northeast ND mainly occurred on the 30th and 31st, in the wraparound band of precipitation. However, rainfall totals were in the 3 to 6 inch range for the entire area. Many counties were already saturated from rains on March 27th, especially in the Devils Lake basin. Therefore, county-wide flood warnings were issued for these areas.

June 11, 2004, 5:28 PM CST – June 11, 2004, 6:40 PM CST

Hail ranging from .75 to 1.00 inches was reported 5 miles southwest of Urbana and 4 miles northeast of Dazey. A tornado passed over the north end of Lake Ashtabula approximately 1 mile north of Sibley with .75 inch hail.

July 2, 2004, 2:58 PM CST – July 2, 2004, 3:00 PM CST

Hail reported 3 miles southwest of Eckelson ranged 1.00 inches in size, with 1.75 inches reported 9 miles southwest of Eckelson.

July 10, 2004, 7:43 PM CST – July 10, 2004, 7:45 PM CST

Winds up to 55 knots were reported in Valley City causing several large tree limbs were blown down. Hail reported 10 miles northwest of Litchville at .75 inches.

July 12, 2004, 2:37 AM CST – July 12, 2004 8:00 PM CST

Winds up to 55 knots were reported in Valley City causing several large tree limbs were blown down. Hail reported in Eckelson at 1.00 inches.

July 18, 2004, 7:25 PM CST – July 18, 2004, 8:00 PM CST

An F4 tornado tracked south for about 4 miles along 97th avenue southeast, then turned to the southeast and tracked about 6 more miles before it crossed into LaMoure county about 2 miles north-northwest of Marion. One abandoned farmstead 10 miles west-northwest of Litchville was nearly swept clean of its buildings. Eight to nine buildings and 5 to 6 metal grain bins were swept away. At an occupied farmstead about 9 miles west of Litchville, the most damage was reported. A family was out baling hay at the time and but were not injured. The equipment they used to bale hay (three tractors and a baler) were the only things left unscathed by the tornado. Two houses, 5 outbuildings, a cattle barn, and miscellaneous farm equipment were all leveled. Machinery and debris were scattered across the yard and in the nearby pond and fields. A new pickup truck was demolished and sheet metal and metal support beams were wrapped around trees and vehicles. About 35 cows were killed, 20 grain bins were demolished, and a semi truck was overturned. The length of this tornado was 10 miles and 200 yards wide. Property damages estimated at \$1.7 million and crop damage at \$100 thousand. The tornado was tracked 6 miles south, southeast of Pillsbury with no damage reported. Winds were report at 75 knots 9 miles west, northwest of Litchville resulting in several power poles snapped off at ground level.

August 2, 2004, 2:20 AM CST – August 2, 2004, 4:30 AM CST

Hail reported in the early morning hours in Pillsbury .75 inches, 5 miles north, northeast of Wimbledon at .88 inches, and 10 miles north of Valley City with 1.50 inches in magnitude.

August 25, 2004, 8:45 PM CST – August 25, 2004, 8:45 PM CST

Hail reported at Wimbledon .88 inches and 5 miles west, northwest of Dazey with 1.00 inches.

March 10, 2005, 3:30 AM CST – March 10, 2005, 11:50 AM CST

A strong cold front moved through the northern plains, as an area of surface low pressure dropped into the Minnesota arrowhead. This brought a period of very strong north to northwest winds to the higher elevations just west of the Red River Valley. Winds were from 40 to 62 mile per hour.

May 7, 2005, 9:32 PM CST – May 8, 2005, 8:00 PM CST

Hail was report 8 miles west, northwest of Pillsbury .88 inches on May 7, 2005. Valley City reported .75 inches of hail on May 8, 2005 along with 2 miles southwest of Dazey at 1.00 inches.

May 20, 2005, 7:00 PM CST – May 21, 2005, 7:00 AM CST

Hail .75 inches was reported 3 miles north of Fingal, 17 miles southwest of Valley City, and 7 miles south east of Wimbledon. On May 21st fields were flooded and water covered several farm access roads in Mansfield Township, 5 miles southwest of Urbana.

June 3, 2005, 6:30 PM CST – June 4, 2005, 4:00 AM CST

Four to 7 inches of rain fell in a four hour period. Three houses were flooded due to excessive runoff from the heavy rain. One house had main floor flooding while the other two had flooding in their garage and shop areas in Sibley. Gravel roads accessing the U. S. Army Corps of Engineers campgrounds southwest of Sibley were washed out. Water flowed across two county roads and cut them down to the culverts 13 miles north of Valley City.

June 7, 2005, 11:45 PM CST – June 7, 2005, 11:45 PM CST

Four inch diameter tree branches were blown down 4 miles east, southeast of Kathryn. Wind speeds at 52 mph.

June 20, 2005, 6:55 AM CST – June 20, 2005, 7:45 AM CST

Trees were uprooted 2 miles southwest of Litchville; trees were blown down in Kathryn resulted a damaged fence and broke a window on a house; hail reported 1.00 inches 6 miles east, southeast of Nome; big trees were torn up and many shingles were ripped off a roof 6 miles southwest of Valley City; large branches in Valley City and trees blown down in Fingal. Wind speeds ranged from 55 to 70 miles per hour.

June 26, 2005, 8:15 AM CST – June 26, 2005, 11:00 PM CST

Hail reported three miles south, southwest of Nome at .75 inches. Winds up to 60 miles per hour caused several 2 foot diameter trees blown down with one falling on a truck.

July 3, 2005, 1:00 AM CST – July 3, 2005, 1:00 AM CST

Cottonwood trees were uprooted and the tops of several other trees were sheared off in the city of Eckelson. Winds were approximately 61 miles per hour.

July 8, 2005, 1:28 AM CST – July 8, 2005, 1:28 AM CST

Winds at 55 miles per hour caused broken tree branches four miles southwest of Eckelson, just south of Interstate 94.

July 14, 2005, 7:15 PM CST – July 14, 2005, 7:15 PM CST

Hail was reported .75 inches 4 miles southeast of Dazey.

July 27, 2005, 6:00 PM CST – July 27, 2005, 6:00 PM CST

Located approximately 8 miles west, northwest of Litchville hail was reported at .75 inches.

September 3, 2005, 3:15 AM CST – September 3, 2005, 4:30 AM CST

Strong winds broke off several large tree branches in a farm yard and shingles off a shed. Winds were 52 to 56 miles an hour, 12 miles south of Sanborn and heavy rain with .75 inch hail 7 miles west, northwest of Fingal.

September 5, 2005, 2:30 PM CST – September 5, 2005 6:06 PM CST

Hail reported .75 inches; 1 miles north of Sibley, 11 miles east of Litchville, and 4 miles north of Valley City.

September 8, 2005, 4:50 AM CST – September 8, 2005, 4:55 PM CST

Hail, .75 inches was reported 2 miles north and 5 miles east, northeast of Fingal.

September 9, 2005, 9:02 PM CST – September 9, 2005, 9:02 PM CST

Hail reported 4 miles southeast of Pillsbury were .88 inches.

November 8, 2005, 6:49 PM CST – November 9, 2005, 4:29 PM CST

An area of surface low pressure took shape over southeast Montana. The low tracked east into north central South Dakota, shifted northeast toward Grand Forks, ND before finally exiting into southwest Ontario. On 11-09-08 the low had deepened to 988 mb. With the rapidly deepening surface low pressure system, northwest winds also became quite strong once the low passed into Canada.

April 13, 2006, 6:30 PM CST – April 13, 2006, 6:30 PM CST

Hail reported 8 miles south, southeast of Oriska of .75 inches.

April 28, 2006, 2:50 PM CST – April 28, 2006, 3:00 PM CST

Hail reported 9 miles southeast of Dazey and 4 miles east, southeast of Litchville of .75 inches.

June 5, 2006, 5:25 PM CST – June 5, 2006, 6:00 PM CST

Hail reported 6 Miles east, southeast of Rogers and 7 miles north, northeast of Oriska of 1.00 inches.

June 23, 2006, 1:35 PM CST – June 23, 2006, 2:30 PM CST

Hail ranging from .75 to .88 inches, 3 miles south, southeast of Kathryn, 7 miles southwest of Pillsbury and 11 miles north of Oriska.

June 24, 2006, 12:45 PM CST – June 24, 2006, 12:45 PM CST

Hail reported 1.00 inches, 2 miles west northwest of Rogers.

July 28, 2006, 11:40 PM CST – July 28, 2006, 11:40 PM CST

Hail reported 7 miles northwest of Litchville of .75 inches.

August 9, 2006, 6:31 PM CST – August 9, 2006, 6:44 PM CST

Sibley reported 6 to 8 inch diameter tree limbs were snapped off by strong winds of 65 kts. Winds measured by a NDAWN sensor 1 mile north of Pillsbury at 56 knots and hail 1.75 inches 2 miles east, southeast of Pillsbury.

August 24, 2006, 4:13 PM CST – August 24, 2006, 4:13 PM CST

Hail reported 4 miles west, northwest of Leal of .88 inches.

September 7, 2006, 4:56 PM CST – September 7, 2006, 5:59 PM CST

Hail reported southeast and southwest of Pillsbury and 2 miles northwest of Oriska of .75 inches.

May 18, 2007, 6:00 PM CST – May 18, 2007, 10:30 PM CST

A strong cold front was located along a line from Devils Lake, ND, to Hallock, MN. Throughout the evening, this cold front slowly sagged southward. By 6 pm CST, the front had reached a line from New Rockford, ND, to Roseau, MN. At this time, Jamestown, ND, reported a temperature of 86 degrees, while Devils Lake had dropped to 66 degrees. By midnight, the front was located along a line from Bemidji (MN) to Fargo (ND) to 20 miles south of Jamestown (ND). Behind the front, the temperature dropped to 39 degrees in Devils Lake a couple hours after midnight. Large hail, tornadoes, and flash flooding occurred during this event. A tornado (F0) was reported 4 miles west northwest of Sibley and a brief touchdown in a field about 3.5 miles northeast of Valley City. Hail was reported 1.75 in the Sibley area; 1.00 inch 3 miles east of Koldok, and .75 inch 5 miles northwest of Litchville.

June 17, 2007, 1:25 PM CST – June 18, 2007, 0:00 AM CST

An area of surface low pressure was located near Mobridge, South Dakota, early in the morning hours of the 17th. A warm front extended to the east from the low, into eastern South Dakota and southern Minnesota. As the low level jet intensified in the late evening, storms began to take shape south of Bismarck. These storms then expanded to the east along the Interstate 94 corridor toward the Fargo-Moorhead area. Hail was reported 1.25 inches 6 miles northwest of Hastings, and 1.00 inches 2 miles north of Fingal and 2 miles north, northwest of Kathryn. Flash flood

waters covered State Highway 32 at numerous spots between markers 86 and 91, 6 miles south of Pillsbury. Flooding occurred 7 miles northwest of Valley City. Several rural roads were closed due to high water levels. There were 38 of 42 townships which reported damage to culverts, roadbeds, and driveways. Standing or flowing water through fields led to extreme crop stress and direct crop loss on about 5000 acres. Showers and thunderstorms moved into Barnes County shortly after midnight on the 17th and remained there until around sunrise. An estimated 2 to 4 inches of rain fell over portions of the county during this 6 hour time period. A NWS Cooperative Observer at Baldhill Dam reported 3.04 inches of rain and an NDAWN mesonet site near Dazey reported 2.46 inches of rain. Flooding also occurred across Barnes County earlier in June. Due to damages sustained during the two flood events, Barnes County received a Presidential Disaster Declaration. Property damage estimated at .5M and crop damage at 3M.

An area of surface low pressure was located just northeast of Jamestown, North Dakota, with a cold front extending south from the low. A warm front arched to the northeast, from near Jamestown to Grand Forks to Bemidji (MN). From the surface through the low layers of the atmosphere, wind speeds were quite strong. One lone thunderstorm cell developed over Polk County (MN). By early evening, another lone thunderstorm developed over Ramsey County (ND). Finally, just before midnight, a line of thunderstorms took shape over eastern North Dakota. This line of storms moved into northwest Minnesota around midnight. Very heavy rain accompanied .75 inch hail 3 miles south of Wimbledon. The thunderstorm contained winds to 60 kts 1 mile northwest of Litchville causing a large steel storage bin to tip over. Large trees were blown down in Valley City and fell on power lines causing power outages. Flash flood 4 miles west northwest of Dazey with ditches and fields under water and water covered a county road just north of State Highway 26.

July 15, 2007, 8:05 PM CST – July 15, 2007, 8:27 PM CST

Penny to quarter size hail and downburst winds affected Ellsburg, Minnie Lake, Weimer and Oriska Townships. Winds reported at 65 kts in the Oriska area, 70 kts around Pillsbury and 87 kts in Fingal. One steel four pole power tower was crumpled and numerous trees were snapped. Additional towers in adjacent Cass County were also destroyed. Wind driven hail also caused crop damage in Springvale and Binghampton Townships. At 3 pm CST on the 15th, a stationary front was located from near Minot (ND) to Jamestown (ND) to near Sisseton (SD). South of the front, the mid afternoon temperatures ranged in the mid 80s to lower 90s. To the north of the front, a meso-high had formed, with much cooler and drier air around it. The temperature across the boundary ranged from 89F at Minot, to 73F at Devils Lake, to 64F at Crookston. The upper air pattern had a western ridge and an eastern trough, putting the northern plains in northwest flow aloft. A strengthening upper jet also moved toward eastern North Dakota, giving this system good surface and upper level support. A super cell thunderstorm developed over southern Steele County around 530 pm CST and tracked across western Cass County and into eastern Ransom County before weakening after 7 pm CST. Then, another super cell thunderstorm formed over northern Steele County around 725 pm CST. This storm tracked just west of the path of the first storm, again mainly hitting central Steele County, western Cass County, and eastern Ransom County, before weakening around 915 pm CST. Both thunderstorms tracked south-southeast at

speeds between 40 and 50 mph and spawned multiple tornadoes which were embedded within the overall downburst wind and hail pattern. The significant downburst wind and wind driven hail was seen in two partially overlapping paths, with each path from 5 to 7 miles wide and between 60 and 80 miles long (this damage path showed up clearly on satellite images). The strength of these winds is believed to have exceeded 80 mph with speeds over 100 mph in some localized areas. Most areas received considerable hail damage at the same time as the strong winds. Law enforcement officials and witnesses stated that the hail often persisted for longer than 5 minutes and completely covered the ground. The hail damaged roofs, windows, and siding in many homes along the damage path. Stripped and decimated corn, bean, and wheat fields were typical along the entire storm path too. The ND Farm Service Administration estimated losses occurred on over 700,000 acres in five counties. Total crop losses may exceed \$250 million, with other property losses from \$15 to \$20 million. Cass and Steele Counties received a Presidential Disaster Declaration.

August 13, 2007, 11:00 AM CST – August 13, 2007, 11:05 AM CST

One large super cell tracked across southwest Benson County (ND) and western Eddy County (ND). This storm tracked southeast toward northern Barnes County (ND), and then weakened as it moved into Cass County (ND). Hail .75 inches was reported 4 miles east of Dazey Bryn Arpt.

August 27, 2007, 2:15 PM CST – August 27, 2007, 2:15 PM CST

By noon CST on the 27th, a weak area of surface low pressure was located over southeast South Dakota, with a stationary front extending to its north-northeast (along a Lidgerwood, ND, to Waskish, MN, line). Thunderstorms initially formed along a line from south of Bismarck (ND) to near Bemidji (MN), and across the tri-state boundary of ND, SD, and MN. The event had deep moisture to tap into, with precipitation water values around 1.5 inches. Hail reported .88 inches 1 mile southeast of Northern Valley City and Valley City.

September 21, 2007, 1:45 AM CST – September 21, 2007, 1:45 PM CST

An episode of storms dealt with 4 distinct groupings passed through Barnes County. Hail reported .75 inches in Valley City.

June 11, 2008, 7:30 AM CST – June 11, 2008, 3:00 PM CST

Many large trees and a grain bin were blown down in Litchville. Many trees were also blown down in Valley City, and in the area between Litchville and Valley City. Some trees and branches knocked down power lines, which resulted in power outages. A barn was blown down 10 miles north of Valley City. High winds developed across portions of east central and southeast North Dakota Wednesday (11th) morning. The winds were thought to be the result of a wake low. Property damage \$300K and crop damage \$200K.

Afternoon heating led to convective overturning and increased episodes of high winds mixing down to the ground. High sustained winds and frequent high wind gusts occurred across portions of west central Minnesota between about 2 pm and 5 pm CDT. Approximately 1 mile west of

Rogers, large three to four inch diameter branches were knocked down by the wind. An area of surface low pressure was located over east central South Dakota at 18z Wednesday (11th), with a very tight surface pressure gradient to its east and northeast (into southeast North Dakota). Wind speeds in the low levels of the atmosphere were also quite strong, and when mixed down to the surface produced some severe wind gusts. Thunderstorms also produced some scattered hail. Property damage \$10K and crop damage \$100K.

June 14, 2008, 6:11 PM CST – June 14, 2008, 6:32 PM CST

The wind gust was measured by the NDAWN wind sensor along Highway 26. Eastern North Dakota and northwestern Minnesota were hit by widespread severe thunderstorms. Most of the thunderstorms fired along a cold front. Winds recorded 2miles east of Dazey at 50 kts. Twelve miles northwest of Valley City reported winds at 61 kts. With .88 inch hail. A tornado (F0) tracked intermittently for about 4 miles starting at 4miles northeast of Koldok and crossed into Cass County. Property damage estimated at \$20K and crop damage at \$40K. It then continued for about one more mile before it lifted about 2 miles northeast of Tower City by 741 pm CDT. A few large branches were broken down in shelterbelts. Peak winds were estimated at 80 mph.

June 24, 2008, 9:00 PM CST – June 24, 2008, 9:00 PM

An old granary was thrown fifty feet, and the wind knocked down two to three inch diameter branches down. Severe thunderstorms developed over western North Dakota then spread east-southeast into portions of eastern North Dakota. Wind gusts of at least fifty knots were reported across parts of Barnes, Cass, and Richland Counties, which was the area with the best elevated instability. Property damage around the Hastings area was \$50K and crop damage at \$20K.

July 7, 2008, 4:30 PM CST – July 7, 2008, 4:30 PM CST

An area of low pressure moved along the Canadian border and developed several severe thunderstorms. A triple point, or the intersection of multiple boundaries, formed in north central North Dakota, and resulted in several tornado reports. Hail was reported .75 inches 2 miles east northeast of Leal.

July 16, 2008, 5:35 AM CST – July 16, 2008, 5:35 AM CST

Elevated thunderstorms clipped Barnes County. One report of hail .75 inches was received 9 miles west of Litchville.

August 2, 2008, 3:10 PM CST – August 2, 2008, 3:10 PM CST

An inverted trough extended into central North Dakota, from an area of surface low pressure over southern South Dakota. This helped spark a few severe thunderstorms from Devils Lake down toward Valley City. Hail was reported .75 inches 2 miles north northwest of Valley City.

August 14, 2008, 5:53 PM CST – August 14, 2008, 7:00 PM CST

A strong upper level low pressure system dived out of Canada and into the western Dakotas. Severe thunderstorms developed across eastern North Dakota and northwestern Minnesota near an inverted trough, which extended north into the area from a surface low pressure system in Nebraska. The slow moving storms produced heavy rainfall amounts in some areas as well as some hail. Hail was reported 1.00 inches 6 miles southwest of Oriska and .88 inches 3 miles west of Pillsbury.

August 26, 2008, 9:18 PM CST – August 26, 2008, 9:18 PM CST

A strong cold front pushed through eastern North Dakota and northwest Minnesota. Several severe thunderstorms developed along the front. Hail was reported .75 inches 3 miles south southwest of Valley City Airport.

September 10, 2008, 8:36 PM CST – September 10, 2008, 8:36 PM CST

Thunderstorms formed between a warm front over northeast South Dakota and a cold front moving into central North Dakota. Lightning struck an office building and started a fire in the attic in Valley City.

October 26, 2008, 5:00 AM CST – October 26, 2008, 9:00 AM CST

A cold front moved through the northern plains on the afternoon of the 25th, bringing strong northwest winds in its wake. The corridor of strongest winds extended from Cando to Finley to Fargo/Moorhead to Fergus Falls, where strong cold advection brought sustained winds of 40 mph. Barnes County reported winds of 35 kts.

June 18, 2009, 2:55 PM CST – June 18, 2009, 2:55 PM CST

Eastern North Dakota remained in a very weak surface pattern with numerous weak surface lows and boundaries across the Midwest. Moisture levels remained very high, with surface dew points in the low to mid 60s. Although the upper level winds were fairly light, another in a series of upper level disturbances shifted over the area. This helped initiate thunderstorm development over southeast North Dakota and west central Minnesota. These storms brought many reports of strong winds. The weak wind flow and moist atmosphere once again brought heavy rainfall to areas along the Canadian border and areas along and south of Interstate 94. Hail fell along the Ransom and Barnes County line. 1.00 inch hail was reported 4 miles southeast of Nome.

Table 5.8.10 shows crop losses from Severe Summer Weather. The following information was provided by the U.S. Department of Agriculture Risk Management Agency documenting crop losses in Barnes County.

Table 5.8.10 – 1990 to 2013 Barnes County Crop Loss from Severe Summer Weather

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|-----------|------------|-----------------|-------------------|-----------|----------------|-----------|--------------|
| 1990 | Sunflowers | Excess Moisture | 114 | 2,583 | 4,022 | 64% | 4 |
| 1990 | Soybeans | Excess Moisture | 442 | 7,922 | 8,762 | 90% | 4 |
| 1990 | Wheat | Frost | 539 | 27,895 | 35,124 | 79% | 4 |
| 1990 | Sunflowers | Hail | 1,686 | 65,987 | 102,218 | 65% | 19 |
| 1990 | Sunflowers | Hail | 2,360 | 86,261 | 153,271 | 56% | 40 |
| 1990 | Oats | Hail | 139 | 4,741 | 6,829 | 69% | 4 |
| 1990 | Corn | Hail | 840 | 40,039 | 59,313 | 68% | 20 |
| 1990 | Soybeans | Hail | 594 | 24,516 | 34,881 | 70% | 11 |
| 1990 | Wheat | Hail | 3,040 | 152,171 | 193,734 | 79% | 28 |
| 1990 | Barley | Hail | 1,488 | 64,103 | 84,412 | 76% | 18 |
| 1990 | Wheat | Heat | 614 | 15,819 | 35,894 | 44% | 5 |
| 1990 | Corn | Heat | 122 | 4,670 | 8,040 | 58% | 5 |
| 1990 | Sunflowers | Insects | 119 | 1,874 | 1,874 | 100% | 4 |
| 1991 | Soybeans | Excess Moisture | 280 | 4,490 | 6,318 | 71% | 5 |
| 1991 | Barley | Excess Moisture | 424 | 10,211 | 23,591 | 43% | 14 |
| 1991 | Wheat | Excess Moisture | 2,431 | 80,076 | 143,901 | 56% | 20 |
| 1991 | Sunflowers | Excess Moisture | 111 | 3,145 | 5,895 | 53% | 6 |
| 1991 | Barley | Hail | 844 | 22,564 | 52,828 | 43% | 15 |
| 1991 | Wheat | Hail | 1,725 | 44,952 | 107,118 | 42% | 18 |
| 1991 | Barley | Hail | 753 | 19,676 | 57,771 | 34% | 5 |
| 1991 | Corn | Heat | 386 | 9,179 | 24,139 | 38% | 10 |
| 1991 | Wheat | Heat | 1,683 | 49,922 | 94,140 | 53% | 14 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1991 | Barley | Heat | 482 | 8,950 | 28,672 | 31% | 7 |
| 1991 | Barley | Heat | 837 | 26,881 | 63,686 | 42% | 18 |
| 1991 | Wheat | Insects | 708 | 20,201 | 46,480 | 43% | 8 |
| 1991 | Barley | Insects | 211 | 8,432 | 11,883 | 71% | 4 |
| 1991 | Corn | Insects | 145 | 9,544 | 12,482 | 76% | 4 |
| 1991 | Oats | Insects | 63 | 1,920 | 2,507 | 77% | 4 |
| 1991 | Soybeans | Insects | 384 | 11,707 | 17,233 | 68% | 4 |
| 1991 | Sunflowers | Insects | 1,174 | 24,464 | 32,416 | 75% | 36 |
| 1992 | Sunflowers | Cold Wet | 597 | 12,307 | 42,544 | 29% | 9 |
| 1992 | Corn | Cold Wet | 1,277 | 73,939 | 108,728 | 68% | 18 |
| 1992 | Soybeans | Cold Wet | 304 | 5,308 | 18,183 | 29% | 5 |
| 1992 | Sunflowers | Excess Moisture | 309 | 11,942 | 21,837 | 55% | 8 |
| 1992 | Wheat | Excess Moisture | 1,021 | 22,657 | 57,216 | 40% | 8 |
| 1992 | Corn | Excess Moisture | 524 | 26,514 | 39,023 | 68% | 10 |
| 1992 | Corn | Freeze | 3,399 | 207,469 | 240,025 | 86% | 74 |
| 1992 | Sunflowers | Freeze | 3,249 | 95,683 | 218,796 | 44% | 43 |
| 1992 | Soybeans | Freeze | 100 | 2,758 | 6,087 | 45% | 4 |
| 1992 | Sunflowers | Frost | 2,419 | 70,632 | 169,079 | 42% | 32 |
| 1992 | Soybeans | Frost | 620 | 16,088 | 33,283 | 48% | 9 |
| 1992 | Corn | Frost | 4,074 | 208,114 | 280,201 | 74% | 84 |
| 1992 | Wheat | Hail | 1,743 | 50,279 | 108,492 | 46% | 12 |
| 1992 | Barley | Hail | 319 | 16,042 | 21,006 | 76% | 6 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1992 | Sunflowers | Hail | 293 | 5,156 | 9,344 | 55% | 6 |
| 1993 | Sunflowers | Cold Wet | 6,809 | 230,244 | 532,474 | 43% | 72 |
| 1993 | Barley | Cold Wet | 1,651 | 36,613 | 98,725 | 37% | 21 |
| 1993 | Corn | Cold Wet | 1,900 | 105,248 | 127,356 | 83% | 53 |
| 1993 | Wheat | Cold Wet | 9,306 | 296,511 | 618,094 | 48% | 49 |
| 1993 | Barley | Cold Wet | 1,813 | 74,646 | 129,628 | 58% | 10 |
| 1993 | Sunflowers | Excess Moisture | 29,648 | 999,021 | 2,193,954 | 46% | 305 |
| 1993 | Barley | Excess Moisture | 2,959 | 109,429 | 212,307 | 52% | 23 |
| 1993 | Wheat | Excess Moisture | 64,493 | 1,662,218 | 4,131,591 | 40% | 312 |
| 1993 | Corn | Excess Moisture | 2,754 | 145,156 | 187,064 | 78% | 53 |
| 1993 | Soybeans | Excess Moisture | 1,765 | 48,020 | 118,220 | 41% | 27 |
| 1993 | Dry Beans | Excess Moisture | 301 | 18,001 | 40,454 | 44% | 7 |
| 1993 | Oats | Excess Moisture | 1,686 | 45,892 | 81,017 | 57% | 36 |
| 1993 | Barley | Excess Moisture | 25,373 | 689,975 | 1,582,325 | 44% | 259 |
| 1993 | Dry Beans | Excess Moisture | 272 | 23,591 | 35,194 | 67% | 5 |
| 1993 | Corn | Freeze | 2,111 | 128,459 | 153,591 | 84% | 35 |
| 1993 | Sunflowers | Freeze | 418 | 11,862 | 28,421 | 42% | 18 |
| 1993 | Corn | Frost | 2,718 | 158,024 | 183,457 | 86% | 75 |
| 1993 | Sunflowers | Frost | 6,008 | 208,708 | 447,998 | 47% | 58 |
| 1993 | Wheat | Hail | 1,360 | 54,186 | 87,605 | 62% | 15 |
| 1993 | Barley | Hail | 347 | 15,005 | 26,191 | 57% | 6 |
| 1993 | Sunflowers | Insects | 372 | 12,996 | 26,427 | 49% | 7 |
| 1994 | Wheat | Cold Wet | 728 | 22,684 | 52,188 | 43% | 4 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1994 | Barley | Excess Moisture | 1,784 | 29,901 | 98,763 | 30% | 41 |
| 1994 | Barley | Excess Moisture | 947 | 33,804 | 63,426 | 53% | 14 |
| 1994 | Soybeans | Excess Moisture | 188 | 3,572 | 7,277 | 49% | 9 |
| 1994 | Corn | Excess Moisture | 113 | 5,264 | 9,048 | 58% | 4 |
| 1994 | Sunflowers | Excess Moisture | 5,218 | 129,990 | 363,298 | 36% | 60 |
| 1994 | Wheat | Excess Moisture | 24,464 | 676,718 | 1,651,993 | 41% | 169 |
| 1994 | Dry Beans | Excess Moisture | 483 | 44,007 | 52,772 | 83% | 10 |
| 1994 | Oats | Excess Moisture | 402 | 10,186 | 17,178 | 59% | 6 |
| 1994 | Sunflowers | Hail | 3,878 | 171,839 | 290,670 | 59% | 43 |
| 1994 | Barley | Hail | 703 | 28,298 | 52,120 | 54% | 12 |
| 1994 | Wheat | Hail | 15,297 | 555,475 | 1,063,993 | 52% | 89 |
| 1994 | Barley | Hail | 1,341 | 39,279 | 71,315 | 55% | 18 |
| 1994 | Sunflowers | Insects | 1,536 | 27,889 | 38,204 | 73% | 10 |
| 1995 | Corn | Excess Moisture | 3,993 | 170,933 | 174,951 | 98% | 81 |
| 1995 | Dry Beans | Excess Moisture | 399 | 29,755 | 53,303 | 56% | 5 |
| 1995 | Dry Beans | Excess Moisture | 727 | 76,921 | 104,452 | 74% | 6 |
| 1995 | Wheat | Excess Moisture | 56,394 | 1,697,047 | 3,359,385 | 51% | 415 |
| 1995 | Soybeans | Excess Moisture | 3,762 | 165,046 | 183,196 | 90% | 85 |
| 1995 | Oats | Excess Moisture | 1,964 | 59,611 | 71,035 | 84% | 72 |
| 1995 | Sunflowers | Excess Moisture | 31,986 | 1,372,261 | 1,888,051 | 73% | 404 |
| 1995 | Barley | Excess Moisture | 37,450 | 1,256,284 | 1,679,177 | 75% | 424 |
| 1995 | Barley | Excess Moisture | 1,591 | 83,289 | 119,965 | 69% | 10 |
| 1995 | Oats | Hail | 293 | 3,877 | 10,136 | 38% | 8 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1995 | Wheat | Hail | 4,939 | 160,440 | 315,707 | 51% | 38 |
| 1995 | Sunflowers | Hail | 417 | 12,088 | 24,969 | 48% | 10 |
| 1995 | Barley | Hail | 1,370 | 47,938 | 81,031 | 59% | 13 |
| 1995 | Sunflowers | Heat | 498 | 27,215 | 33,621 | 81% | 6 |
| 1995 | Oats | Heat | 131 | 5,662 | 6,993 | 81% | 4 |
| 1995 | Barley | Heat | 1,774 | 39,891 | 103,663 | 38% | 36 |
| 1995 | Wheat | Heat | 8,935 | 184,748 | 481,311 | 38% | 84 |
| 1995 | Wheat | Insects | 44 | 440 | 440 | 100% | 4 |
| 1996 | Corn | Excess Moisture | 4,023 | 158,611 | 162,593 | 98% | 87 |
| 1996 | Soybeans | Excess Moisture | 15,098 | 662,275 | 663,612 | 100% | 225 |
| 1996 | Wheat | Excess Moisture | 15,582 | 408,241 | 702,056 | 58% | 197 |
| 1996 | Oats | Excess Moisture | 890 | 21,342 | 26,226 | 81% | 53 |
| 1996 | Sunflowers | Excess Moisture | 18,719 | 934,598 | 983,550 | 95% | 287 |
| 1996 | Dry Beans | Excess Moisture | 390 | 23,752 | 59,143 | 40% | 5 |
| 1996 | Barley | Excess Moisture | 14,384 | 445,511 | 482,928 | 92% | 298 |
| 1996 | Sunflowers | Excess Moisture | 7,734 | 253,625 | 316,713 | 80% | 184 |
| 1996 | Wheat | Hail | 861 | 26,036 | 60,594 | 43% | 11 |
| 1996 | Sunflowers | Hail | 838 | 23,333 | 54,784 | 43% | 13 |
| 1996 | Wheat | Insects | 173 | 1,843 | 1,843 | 100% | 4 |
| 1996 | Sunflowers | Insects | 603 | 10,863 | 17,802 | 61% | 9 |
| 1997 | Sunflowers | Excess Moisture | 12,752 | 552,573 | 886,922 | 62% | 172 |
| 1997 | Oats | Excess Moisture | 955 | 23,853 | 26,689 | 89% | 51 |
| 1997 | Dry Beans | Excess Moisture | 612 | 44,977 | 44,975 | 100% | 14 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1997 | Soybeans | Excess Moisture | 19,296 | 790,160 | 829,322 | 95% | 313 |
| 1997 | Barley | Excess Moisture | 17,464 | 541,685 | 726,601 | 75% | 318 |
| 1997 | Sunflowers | Excess Moisture | 26,075 | 1,433,962 | 1,464,262 | 98% | 369 |
| 1997 | Dry Beans | Excess Moisture | 352 | 23,289 | 34,757 | 67% | 8 |
| 1997 | Corn | Excess Moisture | 5,401 | 182,830 | 183,244 | 100% | 98 |
| 1997 | Wheat | Excess Moisture | 46,373 | 1,347,604 | 3,271,151 | 41% | 342 |
| 1997 | Sunflowers | Hail | 3,979 | 179,745 | 369,281 | 49% | 42 |
| 1997 | Sunflowers | Hail | 1,146 | 50,429 | 131,320 | 38% | 17 |
| 1997 | Soybeans | Hail | 1,433 | 55,006 | 124,835 | 44% | 14 |
| 1997 | Barley | Hail | 1,621 | 62,773 | 109,405 | 57% | 22 |
| 1997 | Oats | Hail | 76 | 1,209 | 3,195 | 38% | 4 |
| 1997 | Wheat | Hail | 10,696 | 389,716 | 855,317 | 46% | 78 |
| 1997 | Wheat | Heat | 312 | 8,091 | 27,894 | 29% | 4 |
| 1997 | Sunflowers | Insects | 4,235 | 209,231 | 359,421 | 58% | 46 |
| 1998 | Sunflowers | Excess Moisture | 7,352 | 478,542 | 491,648 | 97% | 98 |
| 1998 | Soybeans | Excess Moisture | 5,635 | 264,828 | 360,314 | 73% | 94 |
| 1998 | Oats | Excess Moisture | 319 | 10,894 | 15,353 | 71% | 15 |
| 1998 | Corn | Excess Moisture | 1,573 | 76,795 | 127,740 | 60% | 21 |
| 1998 | Wheat | Excess Moisture | 35,116 | 1,452,208 | 1,962,001 | 74% | 424 |
| 1998 | Dry Beans | Excess Moisture | 301 | 25,265 | 33,486 | 75% | 8 |
| 1998 | Dry Beans | Excess Moisture | 1,617 | 175,212 | 219,792 | 80% | 16 |
| 1998 | Sunflowers | Excess Moisture | 14,484 | 614,181 | 766,317 | 80% | 234 |
| 1998 | Barley | Excess Moisture | 8,215 | 353,117 | 406,902 | 87% | 189 |

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| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1998 | Wheat | Hail | 5,158 | 186,905 | 433,365 | 43% | 36 |
| 1998 | Barley | Hail | 759 | 23,842 | 49,669 | 48% | 17 |
| 1998 | Soybeans | Hail | 1,962 | 52,565 | 89,558 | 59% | 18 |
| 1998 | Sunflowers | Hail | 1,227 | 47,234 | 85,049 | 56% | 16 |
| 1998 | Wheat | Heat | 709 | 15,967 | 52,831 | 30% | 7 |
| 1998 | Wheat | Insects | 584 | 17,766 | 30,780 | 58% | 11 |
| 1998 | Sunflowers | Insects | 381 | 15,527 | 27,845 | 56% | 4 |
| 1999 | Dry Beans | Excess Moisture | 826 | 99,321 | 114,751 | 87% | 11 |
| 1999 | Wheat | Excess Moisture | 78,710 | 3,072,069 | 5,386,989 | 57% | 616 |
| 1999 | Corn | Excess Moisture | 5,066 | 343,188 | 347,428 | 99% | 78 |
| 1999 | Oats | Excess Moisture | 786 | 21,063 | 29,905 | 70% | 24 |
| 1999 | Wheat | Excess Moisture | 39,953 | 4,490,096 | 6,519,125 | 69% | 128 |
| 1999 | Soybeans | Excess Moisture | 10,616 | 477,845 | 564,844 | 85% | 180 |
| 1999 | Sunflowers | Excess Moisture | 16,363 | 1,316,807 | 1,523,997 | 86% | 157 |
| 1999 | Barley | Excess Moisture | 14,541 | 546,104 | 773,990 | 71% | 260 |
| 1999 | Dry Beans | Excess Moisture | 1,433 | 123,051 | 127,010 | 97% | 22 |
| 1999 | Sunflowers | Excess Moisture | 39,982 | 2,064,124 | 2,874,730 | 72% | 467 |
| 1999 | Sunflowers | Hail | 980 | 91,779 | 133,969 | 69% | 8 |
| 1999 | Dry Beans | Hail | 288 | 37,376 | 48,370 | 77% | 4 |
| 1999 | Soybeans | Hail | 2,513 | 109,733 | 212,058 | 52% | 22 |
| 1999 | Dry Beans | Hail | 228 | 20,220 | 33,751 | 60% | 4 |
| 1999 | Corn | Hail | 263 | 20,980 | 32,491 | 65% | 4 |
| 1999 | Oats | Hail | 136 | 3,494 | 4,117 | 85% | 5 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1999 | Wheat | Hail | 13,992 | 641,462 | 1,129,649 | 57% | 88 |
| 1999 | Wheat | Hail | 4,253 | 604,329 | 763,288 | 79% | 20 |
| 1999 | Barley | Hail | 4,746 | 200,813 | 316,273 | 63% | 41 |
| 1999 | Sunflowers | Hail | 3,989 | 229,593 | 388,615 | 59% | 40 |
| 1999 | Sunflowers | Insects | 701 | 67,701 | 76,282 | 89% | 5 |
| 2000 | Sunflowers | Excess Moisture | 18,121 | 1,041,692 | 1,175,449 | 89% | 317 |
| 2000 | Wheat | Excess Moisture | 20,261 | 981,562 | 1,222,456 | 80% | 330 |
| 2000 | Soybeans | Excess Moisture | 8,875 | 366,534 | 653,934 | 56% | 125 |
| 2000 | Sunflowers | Excess Moisture | 8,134 | 578,050 | 610,042 | 95% | 110 |
| 2000 | Oats | Excess Moisture | 175 | 2,920 | 6,264 | 47% | 8 |
| 2000 | Barley | Excess Moisture | 13,734 | 602,819 | 1,111,333 | 54% | 185 |
| 2000 | Wheat | Excess Moisture | 1,982 | 108,319 | 127,970 | 85% | 17 |
| 2000 | Corn | Excess Moisture | 2,184 | 150,020 | 195,736 | 77% | 41 |
| 2000 | Dry Beans | Excess Moisture | 366 | 40,694 | 45,180 | 90% | 10 |
| 2000 | Dry Beans | Excess Moisture | 700 | 64,857 | 66,634 | 97% | 17 |
| 2000 | Wheat | Hail | 409 | 14,176 | 31,605 | 45% | 4 |
| 2001 | Wheat | Excess Moisture | 1,546 | 123,467 | 135,987 | 91% | 14 |
| 2001 | Sunflowers | Excess Moisture | 19,100 | 1,186,880 | 1,235,789 | 96% | 320 |
| 2001 | Corn | Excess Moisture | 105 | 6,283 | 6,283 | 100% | 6 |
| 2001 | Wheat | Excess Moisture | 24,360 | 1,226,600 | 1,497,842 | 82% | 390 |
| 2001 | Soybeans | Excess Moisture | 6,049 | 333,578 | 377,736 | 88% | 149 |
| 2001 | Dry Beans | Excess Moisture | 64 | 7,982 | 7,982 | 100% | 4 |
| 2001 | Barley | Excess Moisture | 6,681 | 345,084 | 441,618 | 78% | 147 |

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| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2001 | Dry Beans | Excess Moisture | 986 | 91,294 | 94,363 | 97% | 22 |
| 2001 | Dry Beans | Excess Moisture | 290 | 27,882 | 27,882 | 100% | 5 |
| 2001 | Sunflowers | Excess Moisture | 8,311 | 716,819 | 716,818 | 100% | 109 |
| 2001 | Oats | Excess Moisture | 235 | 6,258 | 8,215 | 76% | 10 |
| 2001 | Dry Beans | Excess Moisture | 2,237 | 241,552 | 241,840 | 100% | 26 |
| 2001 | Corn | Excess Moisture | 5,496 | 502,742 | 506,885 | 99% | 88 |
| 2001 | Barley | Hail | 712 | 33,914 | 58,989 | 57% | 14 |
| 2001 | Sunflowers | Hail | 836 | 74,861 | 110,519 | 68% | 7 |
| 2001 | Oats | Hail | 584 | 13,704 | 22,825 | 60% | 4 |
| 2001 | Soybeans | Hail | 11,332 | 519,827 | 1,022,609 | 51% | 75 |
| 2001 | Sunflowers | Hail | 2,521 | 97,070 | 221,615 | 44% | 37 |
| 2001 | Wheat | Hail | 4,145 | 155,316 | 356,936 | 44% | 29 |
| 2002 | Dry Beans | Excess Moisture | 275 | 28,592 | 28,592 | 100% | 7 |
| 2002 | Corn | Excess Moisture | 2,829 | 276,861 | 301,321 | 92% | 64 |
| 2002 | Barley | Excess Moisture | 2,646 | 142,639 | 162,914 | 88% | 83 |
| 2002 | Dry Beans | Excess Moisture | 898 | 82,509 | 110,987 | 74% | 12 |
| 2002 | Sunflowers | Excess Moisture | 12,350 | 816,206 | 837,598 | 97% | 245 |
| 2002 | Sunflowers | Excess Moisture | 3,010 | 302,444 | 302,440 | 100% | 50 |
| 2002 | Oats | Excess Moisture | 124 | 5,736 | 5,736 | 100% | 5 |
| 2002 | Soybeans | Excess Moisture | 4,294 | 264,467 | 341,316 | 77% | 101 |
| 2002 | Wheat | Excess Moisture | 14,449 | 905,170 | 1,145,355 | 79% | 279 |
| 2002 | Corn | Excess Moisture | 35 | 1,619 | 1,619 | 100% | 4 |
| 2002 | Wheat | Frost | 361 | 15,651 | 35,493 | 44% | 5 |

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| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2002 | Wheat | Hail | 6,330 | 339,745 | 652,043 | 52% | 41 |
| 2002 | Corn | Hail | 561 | 53,081 | 82,998 | 64% | 8 |
| 2002 | Soybeans | Hail | 9,133 | 528,516 | 1,345,343 | 39% | 41 |
| 2002 | Dry Beans | Hail | 623 | 108,523 | 108,523 | 100% | 8 |
| 2002 | Sunflowers | Hail | 843 | 48,967 | 74,072 | 66% | 7 |
| 2002 | Sunflowers | Hail | 1,083 | 104,083 | 159,862 | 65% | 5 |
| 2002 | Barley | Hail | 473 | 24,079 | 60,654 | 40% | 7 |
| 2002 | Barley | Heat | 275 | 5,765 | 17,399 | 33% | 7 |
| 2002 | Soybeans | Heat | 633 | 29,634 | 71,546 | 41% | 7 |
| 2002 | Wheat | Heat | 5,974 | 179,989 | 556,683 | 32% | 35 |
| 2002 | Oats | Heat | 304 | 5,102 | 11,437 | 45% | 5 |
| 2003 | Corn | Excess Moisture | 4,141 | 324,008 | 391,736 | 83% | 61 |
| 2003 | Sunflowers | Excess Moisture | 2,658 | 270,279 | 270,280 | 100% | 62 |
| 2003 | Soybeans | Excess Moisture | 8,422 | 615,009 | 719,677 | 85% | 154 |
| 2003 | Dry Beans | Excess Moisture | 438 | 41,051 | 41,051 | 100% | 14 |
| 2003 | Wheat | Excess Moisture | 9,332 | 577,951 | 599,027 | 96% | 218 |
| 2003 | Dry Beans | Excess Moisture | 414 | 55,575 | 55,575 | 100% | 12 |
| 2003 | Barley | Excess Moisture | 2,394 | 141,602 | 142,610 | 99% | 63 |
| 2003 | Sunflowers | Excess Moisture | 9,662 | 740,623 | 749,167 | 99% | 196 |
| 2003 | Wheat | Hail | 1,306 | 61,558 | 123,584 | 50% | 9 |
| 2003 | Barley | Hail | 631 | 34,695 | 97,246 | 36% | 8 |
| 2003 | Soybeans | Hail | 18,225 | 1,561,062 | 3,395,821 | 46% | 70 |
| 2003 | Soybeans | Heat | 323 | 23,705 | 43,283 | 55% | 4 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2004 | Wheat | Cold Wet | 196 | 5,877 | 16,344 | 36% | 4 |
| 2004 | Corn | Cold Wet | 17,389 | 1,903,700 | 3,363,809 | 57% | 97 |
| 2004 | Soybeans | Cold Wet | 40,660 | 2,153,012 | 6,476,120 | 33% | 149 |
| 2004 | Barley | Cold Wet | 772 | 230,171 | 337,918 | 68% | 13 |
| 2004 | Sunflowers | Cold Wet | 932 | 99,142 | 149,699 | 66% | 6 |
| 2004 | Dry Beans | Cold Wet | 258 | 25,971 | 44,090 | 59% | 4 |
| 2004 | Sunflowers | Cold Wet | 1,435 | 81,589 | 186,356 | 44% | 20 |
| 2004 | Dry Beans | Excess Moisture | 1,424 | 144,534 | 145,941 | 99% | 20 |
| 2004 | Barley | Excess Moisture | 3,426 | 110,346 | 306,748 | 36% | 46 |
| 2004 | Dry Beans | Excess Moisture | 453 | 54,766 | 54,766 | 100% | 4 |
| 2004 | Sunflowers | Excess Moisture | 3,194 | 313,492 | 354,427 | 88% | 60 |
| 2004 | Wheat | Excess Moisture | 5,984 | 377,549 | 456,201 | 83% | 167 |
| 2004 | Sunflowers | Excess Moisture | 10,980 | 929,281 | 1,085,533 | 86% | 167 |
| 2004 | Dry Beans | Excess Moisture | 371 | 23,427 | 28,036 | 84% | 14 |
| 2004 | Soybeans | Excess Moisture | 21,638 | 1,242,075 | 2,507,701 | 50% | 184 |
| 2004 | Corn | Excess Moisture | 2,438 | 200,188 | 313,166 | 64% | 63 |
| 2004 | Sunflowers | Freeze | 1,766 | 124,574 | 272,614 | 46% | 12 |
| 2004 | Corn | Freeze | 12,599 | 1,651,656 | 2,480,128 | 67% | 56 |
| 2004 | Soybeans | Freeze | 29,307 | 1,627,717 | 4,686,866 | 35% | 112 |
| 2004 | Corn | Frost | 204 | 15,974 | 27,139 | 59% | 6 |
| 2004 | Barley | Frost | 652 | 29,782 | 97,297 | 31% | 4 |
| 2004 | Sunflowers | Frost | 1,981 | 76,788 | 256,442 | 30% | 21 |
| 2004 | Soybeans | Frost | 60,315 | 3,072,469 | 9,510,984 | 32% | 239 |

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| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2004 | Corn | Frost | 18,248 | 2,203,550 | 3,456,717 | 64% | 118 |
| 2004 | Dry Beans | Frost | 357 | 21,336 | 53,057 | 40% | 5 |
| 2004 | Corn | Hail | 141 | 10,158 | 20,876 | 49% | 7 |
| 2004 | Soybeans | Hail | 6,532 | 532,255 | 958,092 | 56% | 31 |
| 2004 | Wheat | Hail | 1,245 | 34,977 | 125,048 | 28% | 13 |
| 2005 | Dry Beans | Excess Moisture | 248 | 25,272 | 25,271 | 100% | 9 |
| 2005 | Sunflowers | Excess Moisture | 6,165 | 452,650 | 493,460 | 92% | 116 |
| 2005 | Dry Beans | Excess Moisture | 1,809 | 195,052 | 207,381 | 94% | 23 |
| 2005 | Dry Beans | Excess Moisture | 246 | 28,243 | 28,243 | 100% | 8 |
| 2005 | Oats | Excess Moisture | 251 | 5,833 | 15,899 | 37% | 10 |
| 2005 | Corn | Excess Moisture | 6,567 | 583,314 | 638,747 | 91% | 93 |
| 2005 | Sunflowers | Excess Moisture | 3,209 | 296,967 | 344,887 | 86% | 48 |
| 2005 | Barley | Excess Moisture | 2,401 | 161,222 | 206,738 | 78% | 67 |
| 2005 | Soybeans | Excess Moisture | 22,364 | 1,681,866 | 1,885,643 | 89% | 266 |
| 2005 | Wheat | Excess Moisture | 16,563 | 717,696 | 1,432,419 | 50% | 212 |
| 2006 | Dry Beans | Excess Moisture | 715 | 75,417 | 75,466 | 100% | 15 |
| 2006 | Soybeans | Excess Moisture | 6,122 | 455,890 | 455,875 | 100% | 134 |
| 2006 | Barley | Excess Moisture | 580 | 35,086 | 35,084 | 100% | 24 |
| 2006 | Sunflowers | Excess Moisture | 1,733 | 174,951 | 174,944 | 100% | 43 |
| 2006 | Corn | Excess Moisture | 2,542 | 376,498 | 376,508 | 100% | 61 |
| 2006 | Wheat | Excess Moisture | 7,192 | 617,482 | 617,460 | 100% | 160 |
| 2006 | Dry Beans | Excess Moisture | 119 | 12,423 | 12,423 | 100% | 4 |
| 2006 | Sunflowers | Excess Moisture | 2,622 | 219,107 | 219,101 | 100% | 74 |

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| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2006 | Corn | Hail | 388 | 37,755 | 113,214 | 33% | 6 |
| 2006 | Soybeans | Hail | 7,480 | 387,799 | 1,026,226 | 38% | 30 |
| 2006 | Wheat | Hail | 286 | 8,821 | 34,288 | 26% | 4 |
| 2006 | Soybeans | Heat | 815 | 41,532 | 121,896 | 34% | 10 |
| 2006 | Corn | Heat | 435 | 52,448 | 98,055 | 53% | 12 |
| 2007 | Corn | Excess Moisture | 10,094 | 1,614,288 | 2,321,568 | 70% | 116 |
| 2007 | Wheat | Excess Moisture | 11,324 | 927,234 | 1,616,647 | 57% | 195 |
| 2007 | Dry Beans | Excess Moisture | 171 | 20,791 | 20,791 | 100% | 9 |
| 2007 | Dry Beans | Excess Moisture | 496 | 87,608 | 87,608 | 100% | 4 |
| 2007 | Sunflowers | Excess Moisture | 2,761 | 364,900 | 395,312 | 92% | 38 |
| 2007 | Dry Beans | Excess Moisture | 1,270 | 187,500 | 187,777 | 100% | 18 |
| 2007 | Barley | Excess Moisture | 2,742 | 184,262 | 343,296 | 54% | 45 |
| 2007 | Soybeans | Excess Moisture | 38,801 | 4,876,785 | 5,585,111 | 87% | 386 |
| 2007 | Sunflowers | Excess Moisture | 4,960 | 557,984 | 610,347 | 91% | 70 |
| 2007 | Wheat | Hail | 4,788 | 401,237 | 837,088 | 48% | 34 |
| 2007 | Barley | Hail | 893 | 72,879 | 162,947 | 45% | 9 |
| 2007 | Corn | Hail | 1,662 | 241,576 | 485,965 | 50% | 16 |
| 2007 | Soybeans | Hail | 13,114 | 993,995 | 2,336,099 | 43% | 63 |
| 2007 | Barley | Heat | 269 | 22,337 | 57,747 | 39% | 8 |
| 2007 | Wheat | Heat | 343 | 7,630 | 57,167 | 13% | 4 |
| 2008 | Corn | Cold Wet | 1,783 | 231,329 | 713,752 | 32% | 9 |
| 2008 | Soybeans | Cold Wet | 5,961 | 441,228 | 1,802,047 | 24% | 19 |
| 2008 | Sunflowers | Excess Moisture | 1,145 | 250,594 | 274,491 | 91% | 31 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2008 | Corn | Excess Moisture | 4,021 | 984,882 | 1,252,304 | 79% | 78 |
| 2008 | Barley | Excess Moisture | 232 | 27,796 | 42,240 | 66% | 8 |
| 2008 | Wheat | Excess Moisture | 3,096 | 579,974 | 607,882 | 95% | 99 |
| 2008 | Soybeans | Excess Moisture | 17,939 | 1,891,384 | 5,042,859 | 38% | 153 |
| 2008 | Sunflowers | Excess Moisture | 653 | 136,056 | 166,172 | 82% | 13 |
| 2008 | Corn | Hail | 324 | 57,505 | 138,029 | 42% | 5 |
| 2008 | Soybeans | Hail | 19,564 | 1,565,224 | 3,995,419 | 39% | 76 |
| 2008 | Soybeans | Heat | 25,139 | 2,383,068 | 8,533,366 | 28% | 44 |
| 2009 | Soybeans | Cold Wet | 17,106 | 929,198 | 4,060,476 | 23% | 64 |
| 2009 | Corn | Cold Wet | 13,926 | 1,742,740 | 5,359,800 | 33% | 30 |
| 2009 | Sunflowers | Excess Moisture | 2,108 | 389,162 | 389,159 | 100% | 40 |
| 2009 | Soybeans | Excess Moisture | 34,616 | 4,632,151 | 5,693,742 | 81% | 363 |
| 2009 | Dry Beans | Excess Moisture | 294 | 57,863 | 57,863 | 100% | 7 |
| 2009 | Dry Beans | Excess Moisture | 129 | 21,906 | 21,906 | 100% | 4 |
| 2009 | Wheat | Excess Moisture | 12,240 | 1,559,288 | 1,642,934 | 95% | 225 |
| 2009 | Corn | Excess Moisture | 31,061 | 6,143,381 | 7,414,594 | 83% | 247 |
| 2009 | Barley | Excess Moisture | 1,761 | 199,016 | 204,667 | 97% | 24 |
| 2009 | Sunflowers | Excess Moisture | 2,407 | 355,943 | 356,927 | 100% | 58 |
| 2009 | Soybeans | Freeze | 3,681 | 167,356 | 860,456 | 19% | 13 |
| 2009 | Corn | Freeze | 199 | 38,807 | 53,952 | 72% | 5 |
| 2009 | Soybeans | Hail | 678 | 49,160 | 134,246 | 37% | 9 |
| 2010 | Soybeans | Cold Wet | 965 | 149,378 | 149,375 | 100% | 17 |
| 2010 | Wheat | Cold Wet | 173 | 21,751 | 21,749 | 100% | 5 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2010 | Corn | Cold Wet | 537 | 118,443 | 118,441 | 100% | 11 |
| 2010 | Barley | Excess Moisture | 963 | 69,056 | 109,803 | 63% | 19 |
| 2010 | Dry Beans | Excess Moisture | 590 | 130,690 | 130,690 | 100% | 6 |
| 2010 | Sunflowers | Excess Moisture | 1,786 | 410,509 | 410,507 | 100% | 33 |
| 2010 | Soybeans | Excess Moisture | 36,074 | 5,875,521 | 6,823,371 | 86% | 348 |
| 2010 | Barley | Excess Moisture | 226 | 20,077 | 21,228 | 95% | 6 |
| 2010 | Oats | Excess Moisture | 99 | 5,701 | 6,225 | 92% | 5 |
| 2010 | Sunflowers | Excess Moisture | 2,736 | 441,321 | 486,134 | 91% | 44 |
| 2010 | Corn | Excess Moisture | 23,775 | 7,057,301 | 7,299,699 | 97% | 244 |
| 2010 | Wheat | Excess Moisture | 7,460 | 1,083,141 | 1,103,460 | 98% | 191 |
| 2010 | Corn | Hail | 1,797 | 304,843 | 828,180 | 37% | 12 |
| 2010 | Wheat | Hail | 1,618 | 146,188 | 303,043 | 48% | 13 |
| 2010 | Soybeans | Hail | 8,052 | 887,535 | 1,919,738 | 46% | 54 |
| 2011 | Sunflowers | Cold Wet | 289 | 65,655 | 76,608 | 86% | 8 |
| 2011 | Soybeans | Cold Wet | 4,803 | 843,773 | 1,123,976 | 75% | 57 |
| 2011 | Wheat | Cold Wet | 3,328 | 616,657 | 960,806 | 64% | 44 |
| 2011 | Corn | Cold Wet | 1,624 | 484,375 | 511,676 | 95% | 30 |
| 2011 | Sunflowers | Excess Moisture | 5,429 | 1,249,050 | 1,563,390 | 80% | 65 |
| 2011 | Barley | Excess Moisture | 1,316 | 160,259 | 284,498 | 56% | 8 |
| 2011 | Oats | Excess Moisture | 177 | 15,204 | 15,800 | 96% | 10 |
| 2011 | Dry Beans | Excess Moisture | 862 | 122,443 | 204,872 | 60% | 14 |
| 2011 | Corn | Excess Moisture | 41 | 6,934 | 6,934 | 100% | 6 |
| 2011 | Wheat | Excess Moisture | 69,394 | 9,746,512 | 20,735,123 | 47% | 388 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 2011 | Dry Beans | Excess Moisture | 895 | 162,992 | 258,783 | 63% | 10 |
| 2011 | Sunflowers | Excess Moisture | 3,601 | 1,033,966 | 1,107,568 | 93% | 39 |
| 2011 | Dry Beans | Excess Moisture | 293 | 75,301 | 75,300 | 100% | 4 |
| 2011 | Soybeans | Excess Moisture | 114,701 | 18,264,053 | 31,863,088 | 57% | 488 |
| 2011 | Corn | Excess Moisture | 66,412 | 23,852,579 | 25,614,972 | 93% | 314 |
| 2011 | Barley | Excess Moisture | 2,408 | 394,890 | 664,667 | 59% | 24 |
| 2011 | Soybeans | Freeze | 3,470 | 268,505 | 1,129,855 | 24% | 12 |
| 2011 | Soybeans | Frost | 631 | 71,319 | 193,847 | 37% | 4 |
| 2011 | Barley | Hail | 446 | 38,948 | 140,028 | 28% | 5 |
| 2011 | Corn | Hail | 478 | 91,273 | 243,165 | 38% | 5 |
| 2011 | Soybeans | Hail | 15,010 | 994,926 | 5,357,421 | 19% | 36 |
| 2011 | Wheat | Hail | 3,153 | 376,102 | 1,090,404 | 34% | 22 |
| 2011 | Wheat | Heat | 4,715 | 364,053 | 1,714,626 | 21% | 27 |
| 2012 | Sunflowers | Excess Moisture | 181 | 48,802 | 48,802 | 100% | 9 |
| 2012 | Sunflowers | Excess Moisture | 321 | 81,459 | 81,459 | 100% | 9 |
| 2012 | Wheat | Excess Moisture | 1,863 | 344,742 | 351,107 | 98% | 38 |
| 2012 | Corn | Excess Moisture | 2,793 | 1,076,973 | 1,072,645 | 100% | 50 |
| 2012 | Soybeans | Excess Moisture | 4,898 | 955,955 | 971,941 | 98% | 103 |
| 2012 | Barley | Excess Moisture | 139 | 21,858 | 21,858 | 100% | 8 |
| 2012 | Corn | Hail | 365 | 65,996 | 321,858 | 21% | 4 |
| 2012 | Soybeans | Hail | 4,072 | 313,446 | 1,178,676 | 27% | 17 |
| 2013 | Soybeans | Cold Wet | 311 | 32,219 | 32,219 | 100% | 7 |
| 2013 | Corn | Excess Moisture | 7,884 | 1,313,254 | 4,055,203 | 32% | 51 |

Chapter 5

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|-----------------|--------------------------|----------------------|-----------------------|------------------|---------------------|
| 2013 | Wheat | Excess Moisture | 603 | 133,573 | 133,573 | 100% | 21 |
| 2013 | Barley | Excess Moisture | 107 | 15,428 | 19,106 | 81% | 6 |
| 2013 | Soybeans | Excess Moisture | 5,716 | 969,651 | 1,559,418 | 62% | 75 |
| 2013 | Sunflowers | Excess Moisture | 106 | 20,902 | 24,405 | 86% | 4 |
| 2013 | Soybeans | Hail | 8,032 | 401,057 | 1,750,366 | 23% | 29 |
| 2013 | Corn | Hail | 9,101 | 1,218,264 | 5,116,338 | 24% | 16 |
| 2013 | Soybeans | Heat | 1,384 | 91,633 | 406,242 | 23% | 5 |
| 2013 | Corn | Heat | 836 | 122,402 | 446,626 | 27% | 6 |
| Total | | | 2,345,139 | \$202,148,886 | \$333,913,031 | 61% | 24,316 |

Source: United States Department of Agriculture Risk Management Agency

5.9 Severe Winter Weather

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

Characteristics

Winter storms have the capability to completely immobilize large areas of a state or several states simultaneously. Winter storms occur in several forms, such as heavy snow storms, blizzards, and ice storms. Each in its own way is a potential killer of hundreds of people whenever the storm strikes. A brief explanation of each follows:

Blizzards are the most dramatic and dangerous winter storms. A blizzard has winds of 35 mph or more with snow and blowing snow reducing visibility to less than ¼ mile for at least 3 hours. Blizzards are usually characterized by low temperatures and by strong winds bearing large amounts of snow. Snowfall is usually present during the early stages of the blizzard. However, most of the snow in a blizzard is in the form of fine, powdery particles of snow which are whipped up from the surface in such great density that at times the visibility is only a few yards, creating a blinding condition.

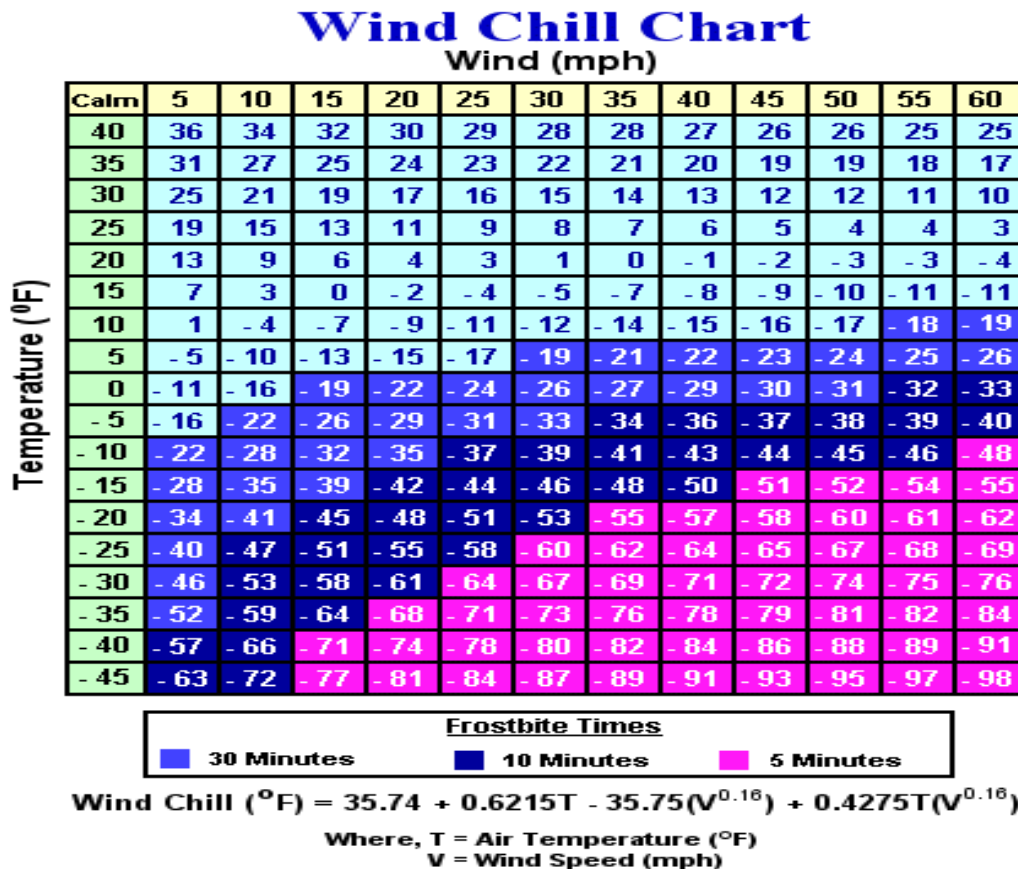
Heavy Snow storm is probably the most significant winter weather phenomenon. Snow can be continuous, intermittent, flurries or if showery in nature, snow squalls. Snow squalls are brief, intense falls of snow for short durations and are comparable to summer rain showers. Blowing and drifting snow often happen together, due to strong winds and falling snow or loose snow on the ground.

Recycled Snow is the ongoing blowing and drifting of already accumulated snow from one or more snow events that continues to blow and drift for days and weeks. The blowing snow is raised above the surface and blows in quantities that reduce visibility, continuously form new drifts, and fills in plowed roads three or four times per day. It is the most significant winter weather phenomenon in the county.

Ice Storms Freezing rain or freezing drizzle is rain or drizzle occurring when surface temperatures are below freezing. The moisture falls in liquid form but freezes upon impact, resulting in a coating of ice or glaze on all exposed surfaces. This is often called an ice storm. Sleet is sometimes incorrectly referred to as an ice storm. Sleet is frozen rain drop, ice pellets, which bounce when hitting the ground. Sleet does not stick to trees, but a sufficient depth can cause hazardous driving conditions. Heavy accumulations of ice can bring down trees and topple utility poles and communication towers. Ice can disrupt communications and power for days while utility companies repair extensive damage. Even small accumulations of ice can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces.

Extreme Cold includes long periods of cold temperatures throughout the winter months. People are forced to limit time spent outdoors in extreme cold conditions. When cold temperatures combine with wind, dangerous wind chill occurs. Wind chill describes how cold it feels and is based on heat loss on exposed skin from wind and cold. The wind chill makes it feel much colder than the actual temperature.

Figure 5.9.1 Wind Chill Chart



Source: National Weather Service

The winter season can begin as early as September and last into May. Generally, a period from mid-November through early April provides the bulk of winter storms.

By nature, different types of winter weather occur within a winter storm, and varying intensities. Strong winds, extreme cold, accumulations of ice and heavy snow, and dangerous wind chills are typically what most affect our region. Winter storms may be deceptive because many deaths and injuries are directly related to the storm. Each year, dozens of Americans die due to exposure to cold. Add to that number, vehicle accidents and fatalities, fires due to dangerous use of heaters and other winter weather fatalities and you have a significant threat. People can be hurt or killed in traffic accidents on icy roads, while shoveling snow, or from hypothermia due to prolonged exposure to cold.

Blizzards can last from from than 24 hours (in faster moving storms) to more than four days (in slower moving ones). There are two major winter storm tracks that can be explained. The northern track produces the Alberta Low Pressure System, commonly called the Alberta Clipper. This is usually a fast moving storm producing blizzard conditions for a relatively short period of time. They are usually followed by extreme low temperatures. Alberta Lows have traveled as fast as 90 mph and have been known to become stationary. The southern track produces the Colorado Low Pressure System. This type

of storm moves more slowly and more erratically than the Alberta Low. The Colorado Lows have traveled as fast as 60 mph, but have also been known to stop and become stationary for as long as 18 hours. Both of these storms can be deadly.

Low temperatures combined with high winds are extremely dangerous and can cause extensive damage to public and private property. Each year a number of people, stranded in a blizzard attempt to walk to safety and become lost. They often suffer from hunger, thirst, severe frostbite, and hypothermia. Frostbite can lead to loss of fingers and toes or cause permanent kidney, pancreas and liver injury and even death. Hypothermia has often been called “The killer of the unprepared”. It is also the number one killer of many outdoor sports enthusiasts.

Hypothermia is a condition where the body temperature, or core temperature, is lowered. The blood is cooled, reducing oxygen carried to the brain and dulling senses. The victim becomes fatigued, delirious, and loses dexterity of arms and legs. If the body’s core temperature continues to drop to about 85 degrees F, the victim eventually slips into unconsciousness. If the treatment is not started immediately, the end result is arrest of the circulation and respiratory systems and death.

Wind chill is not the actual temperature but rather how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. Animals are also affected by wind chill; however, cars, plants, and other objects are not.

The livestock industry can be severely impacted during winter storm situations. The snow can prevent cattlemen from getting feed and water to their livestock. Heavy snow can cause shelter roofs to cave in, crushing or suffocating livestock.

History

Barnes County has a documented hazard history that shows 179 occurrences of the hazard between 1935 and April 2014, resulting in a 100 percent frequency and likelihood of the hazard occurring in the future. Table 5.9.1 shows a summary of the severe winter weather history in Barnes County. It documents severe winter weather impacts which includes nearly 1.76 injuries, 4.65 fatalities reported and approximately \$17.62 million in property damage and crop losses of \$33,635. Fatalities from storms are reported for the storm in its entirety and apportioned across all counties impacted. Detailed history can be found in the Hazard Profile and History section at the end of this chapter.

Table 5.9.1 – 1935 to April 2014 Barnes County Severe Winter Weather History Summary

| Severe Winter Weather | | | | | |
|-----------------------|-----------------|----------|------------|-----------------|-------------|
| Number of Occurrences | Date Range | Injuries | Fatalities | Property Damage | Crop Damage |
| 179 | 1935-April 2014 | 1.76 | 4.65 | \$17,622,651 | \$33,635 |

Sources: Spatial Hazard Events and Losses Database for the United States (SHELDUS)
 National Oceanic and Atmospheric Administration (NOAA)
 Information Service/National Climatic Data Center (NCDC)
 2010 Barnes County MHMP

Probability and Magnitude

Hazard history was gathered from NOAA, NCDC, SHELDUS, newspaper accounts, and the previous FEMA-approved Barnes County Mitigation Plan. This data covers an 80-year period from 1935 through April 2014, and documents 179 notable severe winter weather occurrences, which equates to a probability of 100 percent. Total property damage was \$17,622,651 and average annual property damage was approximately \$220,000. The magnitude of the hazard ranges from blizzards, extreme cold/wind chill, heavy snow, winter storms, and ice storms.

Risk Assessment

Table 5.9.2 shows the risk assessment as determined by individual jurisdictions and the committee. The risk assessment methodology can be found in Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction’s impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction’s capabilities to respond to the hazard.

Table 5.9.2 – Risk Assessment Summary Severe Winter Weather Scored Chart

| Severe Winter Weather | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|-----------------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 4 | 4 | 4 | 3 | 2 | 13 |
| Dazey | 4 | 4 | 4 | 4 | 2 | 14 |
| Fingal | 4 | 4 | 4 | 4 | 1 | 15 |
| Kathryn | 3 | 3 | 3 | 2 | 2 | 9 |
| Leal | 3 | 3 | 4 | 4 | 2 | 12 |
| Litchville | 2 | 3 | 1 | 2 | 3 | 5 |
| Nome | 3 | 3 | 3 | 3 | 1 | 11 |
| Oriska | 3 | 4 | 4 | 3 | 3 | 11 |
| Pillsbury | 3 | 4 | 4 | 3 | 1 | 13 |
| Rogers | 3 | 3 | 4 | 4 | 2 | 12 |
| Sanborn | 4 | 3 | 4 | 3 | 1 | 13 |
| Sibley | 4 | 4 | 4 | 3 | 1 | 14 |
| Valley City | 3 | 4 | 4 | 2 | 3 | 10 |
| Wimbledon | 4 | 4 | 4 | 3 | 2 | 13 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|---------------------|
| Seasonal Pattern | October through May |
| Duration | 2 to 3 days |
| Speed of Onset | 6 to 12 hours |

Capabilities of and Vulnerabilities to Jurisdictions

Upon review of the statistics and oral history of residents, the frequency and likelihood of severe winter weather in Barnes County and all jurisdictions are ranked as “4” as this type of weather takes place in the county and its jurisdictions on an annual basis with multiple occurrences. Scoring for impact, vulnerability and capability is specific to each jurisdiction based on past experiences.

Capabilities and vulnerabilities were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Restricted access for emergency services from snow blocking roads • Loss of economy and livestock and potential loss of life • Power outages • Loss of infrastructure from roads being closed • Increased isolation of rural residents and small communities • Isolation of the communities • Severe low temperatures may increase utility costs • Low temperatures may affect alternative fuel sources • Increased cost for fuel for snow removal if we have heavy snow • Highways can become icy reducing mobility speeds • Heavy snow causing heavy spring melting and potential flooding in the spring • Possible displacement of an estimated 639 people based on an average household size of 2.29 people in 279 mobile home structures • Approximately two injuries and nearly five deaths between 1960 and 2013 • Additional calls for emergency services may strain resources • Difficulty sheltering stranded people due to lack of temporary housing structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Hazard occurs multiple times each year • Blizzard conditions, heavy snow, extreme wind chill occur each year • Strong winds are commonplace • 94 occurrences between 1960 and 2013 resulting in a probability of 100 percent |
| Likelihood | 4 | <ul style="list-style-type: none"> • The hazard is part of the climate in the area • Blizzards, heavy snow, high winds and extremely cold temperature are expected • Increased removal of shelterbelts allows more ground blizzards |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Townships do not have equipment to clear roads and rely on farmers • More vulnerable: Roads shut down from accumulation of snow • More vulnerable: 279 mobile homes structures consisting of five percent of the total housing stock • More vulnerable: 24 percent of population (2,632 people) is under the age of 20 and 20 percent consists of people over 65 (2,170 people) • More vulnerable: Longer response times from emergency services |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Lack of road signage limits navigation for emergency services and first responders in rural areas • Less vulnerable: County has adequate equipment for clearing roads • Less vulnerable: Better weather alerts and education of residents through internet, TV and cable • Less vulnerable: Increased awareness through CodeRed |
| Capability | 2 | <ul style="list-style-type: none"> • Active county commission • Contract for engineering, planning, and grant writing • GIS services provided by the state • Relies on regional, state and other agencies for emergency assistance • County has county-wide mutual aid agreement • Active emergency management department with education and outreach available on the department’s website • Stable tax base to maintain funding for the county road department to continue operations and maintain department staff • Administrative support from other county departments |

Vulnerabilities to County-Owned Buildings and Property

Most structures remain unaffected by impacts from severe winter weather with the exception of heavy snow loads, frozen pipes, utility failures or potential damage to structural foundations from freezing and thawing of soil. Roof collapses are the biggest single-event resulting from heavy snow loads. Human life is also at risk from roof collapses. A summary of county and city owned property in Barnes County is provided in Chapter 4.

Vulnerabilities of Critical Facilities and Infrastructure

The greatest issues for critical facilities resulting from severe winter weather impacts are inaccessibility due to blocked roads and utility and power outages. Emergency services can experience difficulty in providing services during power outages and are limited in responding to emergencies when roads are blocked. Critical facilities with backup generators are better equipped to handle impacts from severe winter weather if loss of power does occur. The cities of Berlin and Dickey do not have backup generators for any facilities. The cities of Kathryn, Leal, Nome, Oriska, Pillsbury, Rogers, and Sibley do not have generators.

The greatest issue for critical infrastructure is maintenance of the road system during severe winter weather. During blizzards or snow storms, cars and trucks can become stranded as roads become blocked with heavy snow and ice. This can result in extended response times for emergency services and prevent access to communities. Prolonged closures of roads can threaten propane, fuel and food supplies. Suspended power lines are highly susceptible to fallen tree branches, other debris or accumulation of ice, leading to power outages. Restoration of power can take up to several days or even week. All jurisdictions in the county have experienced power outages during severe winter weather to varying degrees of extent. Delivery of water to jurisdictions can be interrupted by water main breakage resulting from freeze and thaw cycles. Barnes Rural Water District, which provides drinking water to jurisdictions in the county, has not experienced interruptions in service.

Vulnerabilities to New and Future Development

New and future development could be seriously impacted by severe winter weather in jurisdictions that lack building codes and/or enforcement. Homes and businesses lacking the capability of supporting heavy snow loads could experience roof collapse. Jurisdictions without building codes should have improved construction to better withstand severe winter weather.

Street design also plays an important role in vulnerability to severe winter weather. New and future development developed in a “suburban style” manner containing curvilinear roads and cul-de-sacs are more susceptible to severe winter weather impacts. Snow removal on these roadways has been proven difficult and raises the potential for blocked roads and limits access for emergency services. Maintaining a high level of connectivity, which is defined as how often streets or roadways intersect, can increase the ease of snow removal and lessen the impact of blocked roads and maintain access for emergency services.

Increases in population further complicate matters when dealing with severe winter weather. An example of this would be higher numbers of people susceptible to vehicle accidents on icy or blocked roads, health hazards due to wind chill and extreme cold. Conversely, increases in populations in existing jurisdictions may lessen the risk to impacts from severe winter weather as it leads to less isolated populations and increases the number of people reachable by emergency services during an emergency. As shown in Chapter 4, Profile and Inventory on Table 4.2, between 2010 and 2030, Barnes County and the cities of Litchville, Sanborn, Valley City and Wimbledon are projected to increase in population. Projections were not available for the remaining jurisdictions.

Data Limitations and Other Key Documents

Severe winter weather is frequent in Barnes County. The severity and magnitude are not always distinguishable as significant damage does not always occur. This results in data limitations regarding the true impact of the hazard. Fewer storm spotters reduce the amount of reported weather information. Weather data provided by NOAA and other entities can be incomplete.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- North Dakota Emergency Operations Plan
- Barnes County Emergency Operations Plan

Hazard Profile and History

Details outlining blizzard, extreme cold/wind chill, heavy snow, winter storm and ice storms are found in Tables 5.9.3, 5.9.4, 5.9.5, 5.9.6 and 5.9.7, respectively. The data was provided by the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), Special Hazards Events and Losses Database for the United States (SHELDUS), and the 2010 Barnes County Multi-Hazard Mitigation Plan.

Table 5.9.3 – 2003 to 2013 Barnes County Blizzard Events

| | |
|-----------------------------|---|
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 01/11/2009 15:00:00 CST-6 |
| End Date | 01/12/2009 14:50:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Two to 5 inches of snow fell from just west of Devils Lake down into the southern Red River Valley. The most snow, 4 to 5 inches, fell over western Barnes County, Ransom County, and western Sargent County. As north winds increased through the morning of the 12th, wind gusts to around 40 mph caused blizzard conditions in open country. |
| Event Narrative | |
| | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 03/09/2009 14:56:00 CST-6 |
| End Date | 03/11/2009 05:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A Colorado Low, located over the central Rockies on the evening of March 9th, tracked northeast to northern Wisconsin by the evening of the 10th. One swath of heavier snow fell on the 9th, mainly from Jamestown (ND) to Mayville (ND) to Red Lake Falls (MN). Snowfall amounts of 6 to 8 inches fell along this narrow band. Outside of this band, about 2 to 4 inches of snow were reported. As the system wrapped up on the 10th, a much wider swath of snow fell, along with increasing north winds. The most snow was reported along the initial snow band, with total |

| | |
|-----------------------------|---|
| | amounts ranging from 10 to 13 inches. Outside this area, total snowfall amounts ranged from 4 to 8 inches. Maximum north wind gusts during the height of the blizzard ranged from 40 to 50 mph. Interstate 94 was closed from Jamestown to Fargo as was all of Interstate 29 in eastern North Dakota. The wind and snow produced drifts up to 10 feet high in some areas. Most schools closed early on Monday (9th), then remained closed on Tuesday and Wednesday. The Grand Forks and Fargo airports were also closed. |
| Event Narrative | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/24/2009 10:51:00 CST-6 |
| End Date | 12/26/2009 09:01:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | 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. |
| Event Narrative | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 01/25/2010 04:19:00 CST-6 |
| End Date | 01/25/2010 21:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | 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 |

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| | 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. |
| Event Narrative | |
| | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/30/2010 12:16:00 CST-6 |
| End Date | 12/31/2010 03:49:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | As the storm system responsible for the winter storm on the 29th and 30th started to intensify, a surface low pressure system lifted from eastern Nebraska at noon on the 30th and tracked to near Duluth, Minnesota, by midnight. Blizzard conditions developed across portions of southeast North Dakota and west central Minnesota, which had just picked up the 4 to 12 inches of fresh snow. The storm had wide effects on the region, first and foremost on transportation. Interstate 94 was shut down from Jamestown to Alexandria, U. S. Highway 10 was closed from Moorhead to Detroit Lakes, and U. S. Highway 2 was closed from East Grand Forks to Crookston. A 100 car pileup occurred along Interstate 94 west of Fargo, resulting in one death and several injuries. The death was indirect and resulted when a man left his vehicle to help others. All the vehicles involved in the pileup had to wait in their vehicles until rescuers could reach them. Power was also knocked out to several towns in southeast North Dakota. |
| Event Narrative | |
| | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/31/2010 04:20:00 CST-6 |
| End Date | 12/31/2010 23:59:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |

| | |
|--------------------------|---|
| Crop Damage | 0.00K |
| Episode Narrative | As one blizzard event ended, hardly 14 hours passed and portions of the region were back in a second blizzard. These rare back-to-back blizzards ended up shutting down a good majority of events across the area. A second strong surface low pressure system lifted out of southwest Minnesota and tracked toward the Minnesota arrowhead, producing another swath of 6 to 8 inches of snow along with very gusty north winds. This resulted in blizzard conditions from New Year's Eve into the 2011 New Year. Regional transportation means were shut down once again. Most of Interstate 94 remained closed from the first blizzard and all of Interstate 29 in North Dakota shut down. Most segments of U. S. Highway's 10 and 2 were shut down and the airports at Fargo and Grand Forks closed. |
| Event Narrative | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 01/01/2011 00:00:00 CST-6 |
| End Date | 01/01/2011 12:08:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | This event began on December 31, 2010 and carried into January 1, 2011. As one blizzard event ended, hardly 14 hours passed and portions of the region were back in a second blizzard. These rare back-to-back blizzards ended up shutting down a good majority of events across the area. A second strong surface low pressure system lifted out of southwest Minnesota and tracked toward the Minnesota arrowhead, producing another swath of 6 to 8 inches of snow along with very gusty north winds. This resulted in blizzard conditions from New Year's Eve into the 2011 New Year. Regional transportation means were shut down once again. Most of Interstate 94 remained closed from the first blizzard and all of Interstate 29 in North Dakota shut down. Most segments of U. S. Highway's 10 and 2 were shut down and the airports at Fargo and Grand Forks closed. |
| Event Narrative | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 03/11/2011 18:00:00 CST-6 |
| End Date | 03/12/2011 03:50:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |

| | |
|--------------------------|--|
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | 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. |
| Event Narrative | |
| Event | Blizzard |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 02/10/2013 06:00:00 CST-6 |
| End Date | 02/11/2013 03:50:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | A moisture laden Colorado Low tracked from central Nebraska on the morning of the 10th to central Lake Superior by the morning of the 11th. Ahead of the system there was some light freezing rain and fog early as temperatures were quite mild. Snowfall amounts ranged from 5 to 21 inches, with the most snow falling across extreme southeast North Dakota. The falling snow combined with north to northwest winds at 35 to 45 mph to produce whiteout conditions. Interstate 29 was closed from Grand Forks to the South Dakota border, Interstate 94 was closed from Jamestown to Fargo, and North Dakota 13 was closed around Wahpeton. Many schools and other activities closed down on the 11th. |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.9.4 – 2003 to 2013 Barnes County Extreme Cold/Wind Chill Events

| | |
|------------------------|---|
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 01/04/2009 01:00:00 CST-6 |
| End Date | 01/04/2009 13:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

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| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Arctic air returned to the Northern Plains and Upper Midwest Saturday (3th) and Sunday (4th). Brisk westerly winds of 10 to 20 mph created dangerously cold wind chills across eastern North Dakota Saturday night through Sunday evening until the winds subsided Sunday night. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/15/2009 07:00:00 CST-6 |
| End Date | 12/15/2009 09:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | The combination of wind speeds holding up in the 10 to 20 mph range and temperatures well below zero sent wind chill readings to 40 below to 50 below zero. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 01/07/2010 12:02:00 CST-6 |
| End Date | 01/08/2010 12:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | After the winter storm event on January 6th and 7th that brought heavy snow to portions of southeast North Dakota, cold air surged back into the northern plains on brisk northwest winds. Wind chill readings fell to 40 below zero or colder along and west of the Red River Valley. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |

| | |
|-----------------------------|--|
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 02/01/2011 18:00:00 CST-6 |
| End Date | 02/02/2011 12:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | High pressure slid down the western Dakotas, keeping wind speeds in the 5 to 10 mph range over eastern North Dakota and portions of the northwest quarter of Minnesota through the late evening and overnight hours. Combined with temperatures in the teens to lower 20s below zero, wind chill values plummeted to values of 40 below zero or lower. The lowest wind chill readings were 49 below in eastern Eddy County and 47 below at Langdon. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 02/08/2011 03:00:00 CST-6 |
| End Date | 02/08/2011 12:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | Surface high pressure dropped through the western Dakotas, allowing wind speeds to hold up around 10 mph over eastern North Dakota. Combined with temperatures in the teens below zero, wind chills dropped to less than 40 below over eastern North Dakota and the Red River Valley region. The coldest wind chill readings were in the Devils Lake basin, where a station eight miles north of McHenry dipped to 49 below and one at Baker hit 46 below. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | Barnes |
| WFO | FGF |
| Begin Date | 01/18/2012 18:00:00 CST-6 |
| End Date | 01/19/2012 12:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

| | |
|-----------------------------|--|
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | A cold front moved through the northern plains on the 18th, bringing in the coldest air of the season. By the morning of the 19th, low temperatures across the area ranged from 15 below to 25 below. Combined with stiff northwest winds, temperatures felt like 35 below to 45 below zero. The extreme cold caused a buried fiber optic line to break near Enderlin. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | Barnes |
| WFO | FGF |
| Begin Date | 01/20/2013 18:00:00 CST-6 |
| End Date | 01/21/2013 10:51:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | In the wake of the ground blizzard on the 19th that affected portions of northeast North Dakota and the extreme northwest corner of Minnesota, frigid air moved into the region. Morning lows across the area on the 21st ranged from 15 below to 25 below zero, while daytime highs mainly stayed below zero. In combination with winds of 10 to 20 mph, wind chill readings dropped to 40 below to 50 below zero at times. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | Barnes |
| WFO | FGF |
| Begin Date | 01/31/2013 05:02:00 CST-6 |
| End Date | 01/31/2013 23:59:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | Frigid air moved into eastern North Dakota on the 31st along a thin band of clearing. Temperatures fell into the teens below zero with steady northwest winds, which kept wind chill readings around 40 below to 45 below zero. Temperatures did not show |

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| | much recovery during the day hours and winds remained steady. Due to this fact, the wind chill warning continued through February 1st. |
| Event Narrative | |
| Event | Extreme Cold/Wind Chill |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 02/01/2013 00:00:00 CST-6 |
| End Date | 02/01/2013 04:44:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | This event continued over from January 31st. Temperatures from 15 below to 25 below zero combined with northwest winds of 10 to 15 mph to produce wind chill readings around 40 below zero. As winds became light by the early morning hours of the 1st, the warning was cancelled. |
| Event Narrative | |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.9.5 – 2003 to 2013 Barnes County Heavy Snow Events

| | |
|-----------------------------|--|
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 01/09/2009 09:32:00 CST-6 |
| End Date | 01/09/2009 14:35:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A narrow band of 6 to 8 inches of snow fell across southwest Benson County, western Eddy County, southwest Griggs County, and northwest Barnes County. |
| Event Narrative | |
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 10/14/2009 20:26:00 CST-6 |
| End Date | 10/15/2009 06:00:00 CST-6 |

| | |
|-----------------------------|--|
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | An early season storm system brought a mix of rain and snow to eastern North Dakota on October 14th and 15th. Most of the precipitation through the early part of Wednesday (14th) fell as rain, as surface temperatures near the Red River Valley warmed up to around 40 degrees. However, just to the west of the Red River Valley, across the Dazey, Valley City, and Lisbon areas, temperatures were about ten degrees colder, and most of the precipitation fell as slushy snow. Six inches of snow fell at Lisbon and Litchville and 7.5 inches fell in Valley City. The heavy, wet snow broke many tree branches and power lines, which resulted in sporadic power outages for 1500 Valley City residents. Dozens of vehicles slid into the ditch along Interstate 94 in Barnes County. |
| Event Narrative | |
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/23/2009 04:10:00 CST-6 |
| End Date | 12/25/2009 05:59:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | 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. |
| Event Narrative | |
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 01/06/2010 10:29:00 CST-6 |
| End Date | 01/07/2010 04:35:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

| | |
|--------------------------|---|
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A mid-level circulation moved from western North Dakota into eastern South Dakota. The reflection at the surface was an inverted trough, which mainly set up over the central Dakotas. Heavy snow fell near the inverted trough, which did make it into portions of southeast North Dakota. A band of around 11 inches of snow fell across southwest Barnes County and across western Ransom and Sargent Counties. Six to seven inches of snow fell over southwest Richland County. |
| Event Narrative | |
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 11/22/2010 07:23:00 CST-6 |
| End Date | 11/22/2010 21:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | A thin band of heavy snow fell from Lisbon to Fargo, North Dakota, and up towards Mahnommen and Waskish, Minnesota. Over a foot of snow fell right along this band, with amounts tapering off quickly on either side. |
| Event Narrative | |
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/03/2010 11:28:00 CST-6 |
| End Date | 12/03/2010 23:53:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | An area of surface low pressure moved across Nebraska and into southeast Kansas on the 3rd and 4th, while an inverted trough extended up into south central and southeast North Dakota. Six to nine inches of snow fell in a relatively thin band from Lisbon, North Dakota, to Elbow Lake, Minnesota. |
| Event Narrative | |

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|-----------------------------|--|
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/15/2010 19:48:00 CST-6 |
| End Date | 12/16/2010 09:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | 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. |
| Event Narrative | |
| Event | Heavy Snow |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 12/19/2010 14:46:00 CST-6 |
| End Date | 12/21/2010 00:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | 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 Mahnomon (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. |
| Event Narrative | |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.9.6 – 2003 to 2013 Barnes County Winter Storm Events

| | |
|--------------|---------------------------|
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 02/26/2009 08:42:00 CST-6 |
| End Date | 02/26/2009 18:00:00 CST-6 |

| | |
|-----------------------------|--|
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A surface low passed to the south over the central plains, but a strong upper level disturbance and upper jet combined to produce winter storm conditions along and south of Interstate 94 in North Dakota. Four to 16 inches of snow fell across the area, along with north winds of 20 to 30 mph. The most snow fell across southern Richland and Sargent counties, where amounts ranged from 10 to 16 inches. Several schools closed on Thursday (26th), while others only held classes for a portion of the day. Snowplows were pulled off the roads in far southeast North Dakota, as they could not keep up with the snowfall rates. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 03/29/2009 14:27:00 CST-6 |
| End Date | 03/31/2009 21:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | A Colorado Low took shape over northeast Colorado on Monday morning (30th), then tracked slowly to the northeast, reaching the arrowhead of Minnesota by Wednesday morning (April 1st). As the low intensified on Tuesday morning, north-northeast winds became rather gusty, and made travel almost impossible. Nearly two feet of snow fell over central Wilkin County (MN). Snowfall amounts greater than a foot were very common along and south of Interstate 94 in North Dakota and Highway 10 in Minnesota. The snow had very high moisture content, with over 2 inches reported over central Wilkin County. This storm, in combination with the other March storms, brought two new monthly records to the Fargo-Moorhead area. The snowfall total, 28.1 inches, broke the previous record of 26.2 inches set in 1997. The precipitation total, 4.62 inches, broke the previous record of 2.83 inches set in 1882. The snow and wind on the 31st resulted in the closure of Interstate 29 from Grand Forks to the South Dakota border. No travel was advised across most of the warning area. Many schools also closed on the 30th and 31st. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |

| | |
|-----------------------------|---|
| Begin Date | 01/22/2010 04:43:00 CST-6 |
| End Date | 01/23/2010 09:49:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | As a powerful storm system crashed into the west coast and desert southwest, a warm, moist feed of air moved into the northern plains. Temperatures stayed unseasonably mild, in the low to mid 30s, from the 22nd into the morning of the 23rd. This brought a variety of winter weather precipitation forms to eastern North Dakota, including rain, sleet, freezing rain, and snow. Up to a quarter inch of ice accumulated in areas, followed by a wet, slushy snow with low visibilities. This made travel very hazardous in places. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 02/13/2010 11:48:00 CST-6 |
| End Date | 02/13/2010 18:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |
| Episode Narrative | Portions of the northern plains were affected by a second winter storm in less than week that originated in northeast Manitoba. The features of this storm were very similar to the February 6th through 8th event, but were about 75 to 100 miles further west. The upper level low tracked south through the province of Manitoba, Canada, and down through south central North Dakota. At the surface, the low tracked from south central North Dakota into northwest Iowa, with an inverted trough extending up into central North Dakota. Some heavy bursts of snow fell along the inverted trough, with many locations picking up 6 to 12 inches of snow in a twelve hour period. North winds increased toward the end of the event, causing some blowing snow in open country. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 10/26/2010 18:00:00 CST-6 |
| End Date | 10/27/2010 13:16:00 CST-6 |

| | |
|-----------------------------|--|
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | As snow moved into eastern North Dakota, the combination of light snow and strong wind speeds created winter storm conditions. Snow amounts were highly variable with stations reporting nearly no snow to four or so inches. The most snow fell just west of the Red River Valley in southeast North Dakota as well as just east of the valley in west central Minnesota (around Rothsay, Pelican Rapids, and Fergus Falls) This was also a robust rainfall producing system and before the precipitation changed to snow, much of the area picked up one to three inches of rain. As the precipitation type changed from rain to snow, some areas also temporarily picked up some sleet. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 03/22/2011 12:00:00 CST-6 |
| End Date | 03/23/2011 09:15:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | An area of surface low pressure tracked from Nebraska on the 22nd into northern Illinois by the morning of the 23rd. A variety of weather conditions occurred to the north of the surface low. Showers with embedded thunder changed to snow with embedded thunder as far north as the central Red River Valley. Freezing rain fell over portions of Richland County, while other areas saw up to an inch of sleet. At least six inches of snow fell across most of the area, but the Highway 200 corridor from Finley to Mayville to Hillsboro picked up nearly two feet of snow. The adverse weather shut down Interstate 94 from Fargo to Bismarck and Interstate 29 between Grand Forks and Fargo. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 04/15/2011 03:00:00 CST-6 |
| End Date | 04/15/2011 20:00:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |

| | |
|-----------------------------|---|
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | An area of surface low pressure moved across the central plains toward the Great Lakes, while an inverted trough extended up into the northern plains. Along and east of the trough, winds were easterly in direction and relatively dry. As the snow moved in, temperatures generally ranged in the lower to middle 30s. This led to some slushy snow initially, which later froze in spots as temperatures fell into the upper 20s. Travel thus became tricky due to slippery and snow covered roads. The most snow, nearly a foot, fell in the Cooperstown area. A little over six inches fell at Valley City. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | Barnes |
| WFO | FGF |
| Begin Date | 02/25/2012 21:04:00 CST-6 |
| End Date | 02/27/2012 02:27:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | A hybrid type winter storm system moved out of the Pacific Northwest and into western South Dakota by late evening of the 25th. The surface low tracked from western South Dakota into east central South Dakota by the morning of the 26th, and then up toward Duluth by the early evening of the 26th. It did not seem to be a traditional winter storm system as afternoon highs on the 26th rose into the mid to upper 20s over portions of eastern North Dakota and the northwest quarter of Minnesota. As the system moved into Minnesota on the afternoon of the 26th, north wind speeds increased with gusts over 25 mph commonplace. Snowfall totals generally ranged from 4 to 8 inches across the area. Lidgerwood came in with the highest total of 9 inches. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | Barnes |
| WFO | FGF |
| Begin Date | 02/28/2012 18:00:00 CST-6 |
| End Date | 02/29/2012 13:02:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |

| | |
|--------------------------|--|
| Property Damage | 0.00K |
| Crop Damage | 0.00K |
| Episode Narrative | A Colorado low moved up into southwest Minnesota on the morning of the 29th. Temperatures for the morning were quite mild for late February, with many locations across eastern North Dakota and the northwest quarter of Minnesota in the mid-20s to around 30 degrees. Gusty northeast winds in the early morning turned more northerly by late morning, blowing around the fresh snow. Visibilities were poor along Interstate 29 south of Fargo, so the interstate was shut down. Conditions improved rapidly by early afternoon, as there was no cold air surge behind the storm. Afternoon temperatures still ranged in the mid-20s to mid-30s, which allowed the snow to start melting. |
| Event Narrative | |
| Event | Winter Storm |
| State | NORTH DAKOTA |
| County/Area | Barnes |
| WFO | FGF |
| Begin Date | 01/11/2013 18:00:00 CST-6 |
| End Date | 01/12/2013 10:33:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | 0.00K |
| Episode Narrative | 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 2 to 4 inches of snow and some light freezing rain to the region. As north to northwest wind speeds gusted from 30 mph to 40 mph later on the 11th through the morning of the 12th, lower visibilities due to blowing snow also occurred. |
| Event Narrative | |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Table 5.9.7 – 2003 to 2013 Barnes County Ice Storm Events

| | |
|--------------------------|---|
| Event | Ice Storm |
| State | NORTH DAKOTA |
| County/Area | BARNES |
| WFO | FGF |
| Begin Date | 02/08/2009 15:44:00 CST-6 |
| End Date | 02/09/2009 18:30:00 CST-6 |
| Deaths Direct/Indirect | 0/0 (fatality details below, when available...) |
| Injuries Direct/Indirect | 0/0 |
| Property Damage | |
| Crop Damage | |

| | |
|-------------------|--|
| Episode Narrative | 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. |
| Event Narrative | |

Source: National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC)

Hazard history from the 2010 Barnes County MHMP is shown below. Some of the major storms in include:

Winter 1935-1936, temperature extremes and severe blizzards paralyzed Barnes County. Cold was so severe horses’ noses bled pulling sleighs.

Winter 1968-1969, heavy snows caused flooding and ice jams in the spring.

Winter 1978-1979, several inches of slush hit North Dakota in October, froze on the roads, and did not melt off until spring. Heavy snow and snow mixed with field dirt on the roadways throughout the winter.

November 22, 1993, heavy snow affected a large part of North Dakota. A slow moving and enormous storm over North America brought record single-storm snowfall to much of North Dakota. Over two feet of snow fell over a large part of central and southeast North Dakota, and most of North Dakota had over a foot of snow from this storm. The greatest snowfall amount was reported at Oakes, in Dickey County in southeast North Dakota of 31 inches. At the National Weather Service office in Bismarck, 28.3 inches of snow was measured during the 108 hour snow event. This amount set a new single-storm record for snow in Bismarck. The snow began the evening of the 22nd and did not end until the morning of the 27th. Except for about six hours during the day on the 26th, the snow was continuous through this period. The snowfall was intermittent over most of North Dakota during this lengthy event. Fortunately, the wind was only 10 to 25 mph during this storm, so it was well below blizzard conditions and blowing and drifting of snow was not a problem. The storm occurred during the week of Thanksgiving, so many travelers were stranded. The prolonged snowfall kept snow removal crews working around the clock, and a few motorists crashed into the snowplows. Out in the rural areas, some farm buildings collapsed in the heavy snow. Property damage from this storm was estimated at \$500,000.

April 25, 1994, A late season winter storm came a few days after temperatures of 80 degrees. Parts of southern North Dakota received almost a foot of heavy wet snow. Some thunder occurred with the snowfall. Winds of 25 to 45 mph caused blizzard conditions at times, and snow drifts three feet high. This late storm brought record seasonal snowfall to many parts of the state. Snowfall for the winter season topped 100 inches in some places. The storm closed schools and

businesses, and shut down travel. Property damage from this storm was estimated at \$50,000.

January 16, 1995, A low pressure system moved northeast out of the central Rockies and through northern Minnesota. The low was responsible for areas of freezing rain and drizzle, heavy snow and gusty winds. Freezing drizzle and rain preceded the heavy snow and coated the roads and power lines with ice. Logan and LaMoure Counties have power outages due to the ice. Six to twelve inches of snow fell over the area with a maximum of fourteen inches in Underwood in McLean County. The freezing drizzle and rain, heavy snow, and winds gusting to 35 mph made travel hazardous. Several schools were closed and no travel was advised in McHenry, Griggs, Stutsman, Ward, and Dickey Counties.

March 26, 1995, Several hours of light rain and drizzle preceded the snow. Six to eight inches of wet snow was common with Edgeley receiving a total of fourteen inches. Grand Forks and Steele Counties advised to travel.

February 22, 1996, Freezing rain made travel and walking dangerous. No travel was advised and US Highway 2 was closed from Devils Lake to Grand Forks. Minor car accidents and vehicles in the ditch were common. One hospital in Fargo reported setting about a dozen fractured bones on Thursday night.

November 20, 1996, Very little wind accompanied this winter storm. Seven inches of snow fell in Grand Forks and 6.1 inches of snow fell in Fargo.

January 1997, Blizzards racked the area, closing either north-south, or east-west bound roads almost every day. Some days, all roads were closed, including Interstate 94. National Guard was called in with bulldozers to push back drifts, especially on Old #10 where drifts were 15 feet tall and extended across the road between Sanborn and Valley City. Three rotary plows were obtained through North Dakota State Emergency Management to shoot snow away from the ditches to slow down blocking of roads in the next wind. Interstate 94 was closed about 20 days that winter.

January 30, 1997, 0.05 inches of freezing rain fell across eastern North Dakota, causing numerous vehicle accidents. Many vehicles slid off roads, while others could not travel up slopes. Emergency officials could not reach accident scenes or help stranded motorists.

March 13, 1997, A band of heavy snow fell across southeast North Dakota, where Lisbon reported 12 inches of new snow. Litchville and Cayuga both reported 10 inches of new snow, Havanna reported 9 inches, and Lidgerwood reported 8 inches. A north to northeast wind gusted up to 35 mph, which resulted in the closure of Interstate 94 from Bismarck to Fargo.

April 4, 1997, An intense low pressure system, with center pressures around 28.8 inches, tracked from Fergus Falls to International Falls, Minnesota. The initial rain was accompanied by lightning and thunder in southern Grand Forks County, and then changed to freezing rain as the temperatures dropped. On-half to two inches of ice built up on exposed surfaces. Hundreds of power poles and lines snapped due to the weight of the ice, cutting power to many homes and businesses, many of which were beginning to fight the spring flood. The wind reporting systems on the AWOS and ASOS sites across eastern North Dakota froze in place, remaining out for seven days. The three inches of liquid equivalent from the storm fell on top of a record snow pack.

Property damage as a result of this storm was estimated as \$96,000,000.

April, 1997, people were sandbagging for a flood when freezing rain fell and caused power lines to break. This was followed by many inches of grapple, and finally a blizzard and subzero temperatures. As power was cut off, basements in multiple areas began to flood.

November 13, 1997, Four to seven inches of snow fell across southeast North Dakota along with 30 mph wind speeds. Visibilities were low and travel was dangerous. Schools in Valley City were closed for the day.

February 27, 1998, A very strong low pressure system traveled across Minnesota, bringing rain and snow to eastern North Dakota. Temperatures started out in the 30's, much above average for February, with dew points in the 20's. As the low tracked across Minnesota, the storm began with thunder and lightning. Echoes on radar almost seemed more like those seen in the summer months. As the cold air dropped south from Canada into northeast North Dakota, the rain changed to snow. Five inches fell across most of northeast North Dakota. Strong winds picked up across the Devils Lake area, prompting law enforcement to close US Highway 2 west of Devils Lake.

November 18, 1998, The first significant snow event of the winter started out with lightning and thunder. Thunder was reported in Valley City and Fargo. Although visibilities were quite poor due to the heavy snow, very strong winds never materialized. Thirteen inches of snow was measured at the Grand Forks Air Force Base and 12.9 at the NWS in Grand Forks. Slightly lesser amounts were reported south of Grand Forks. Interstate 29 was closed from Fargo to the Canadian Border and US Highway 2 was closed from Devils Lake to Grand Forks.

January 1, 1999, A band of heavy snow fell from the Valley City area southward to Forman, North Dakota. Valley City reported 8 inches of snow, Litchville reported 7.5 inches, and Forman reported 9 inches. Snow totals tapered off rapidly to the east of this area.

April 1, 1999, A strong low pressure system moved out of the central plains into Ontario, bringing moisture and strong winds to portions of eastern North Dakota. With the temperature hovering around the freezing point, much of the rain froze when it make contact with the surface.

With ice built up on trees, many branches broke, resulting in power outages. Most power companies were able to restore power within several hours. A 10 mile section of H-shaped aluminum power poles were snapped by the weight of the ice on the power lines 5 miles north of Valley City. The cost to replace the poles was estimated at \$2.5 to 4 million.

April 3, 1999, A strong low pressure area in Minnesota brought another round of winter weather to eastern North Dakota on the heels of the April Fools Day storm. Significant accumulations of ice built up on all surfaces due to a long period of freezing rain. Thousands of power customers lost power, as power lines snapped due to the weight of the ice. Icicles up to two to four inches long were common on power lines and trees. City foresters were kept busy for weeks trying to haul away branches and fallen trees. This ice storm brought back memories of the ice storm of early April 1997.

March 8, 2000, A narrow band of freezing precipitation fell across southeast North Dakota and

northwest Minnesota. Gusty north winds also combined with the ice to make travel difficult.

Potential damage from winter storms was estimated at \$10,000,000 to building collapse and animal losses. The Winter Show building collapse in 1997 was about \$4,000,000.

February 23, 2001, 6:00 PM CST – February 24, 2001, 11:07 PM CST

A Colorado Low moved from eastern Nebraska into southeast Minnesota, bringing two periods of snow to eastern North Dakota. The first snow moved across the area on the 23rd, started out as freezing drizzle in southeast North Dakota. Snow was widespread of 1 to 3 inches. More snow fell on the 24th, and wind speeds also increased. Five to nine inches of snow was common across this area.

February 24, 2001, 11:08 PM CST – February 25, 2001, 11:47 AM CST

As the low pressure system moved east, strong north winds funneled down the Red River Valley. Whiteout conditions developed, especially along and south of Interstate 94. As a result, Interstate 29 was closed from the South Dakota border to Grandin and Interstate 94 was closed from Buffalo to the Minnesota border. Wind speed gusts ranged from 38 to 44 mph.

April 22, 2001, 3:30 PM CST – April 23, 2001, 3:19 AM CST

A strong low pressure system tracked from Colorado into Wisconsin, and set up an inverted trough over the southern Red River Valley. A mix of rain, freezing rain, and snow fell across southeast North Dakota and west central Minnesota. Snowfall amounts ranged from 7 to 12 inches, with liquid water equivalents from 1 to 2 inches. This snow fell during the spring flood along the Red River, keeping river levels high through the end of the month. Due to the slushy nature of the snow, secondary roads became impassable. Many cars slid off roads and several schools cancelled classes on Monday the 23rd.

December 22, 2001, 12:29 PM CST – December 23, 4:00 AM CST

30 to 35 mph winds, gusting up to 45 mph, along with light snow, brought the visibility down below a quarter mile across the area. Many people were in Grand Forks to watch a basketball game at UND. With no travel recommended, motels quickly filled up and the Alerus Center had to be opened to accommodate people overnight. Numerous cars ended up in ditches, especially along Interstate 94.

March 8, 2002, 3:35 PM CST – March 9, 2002, 11:16 AM CST

Strong winds and snow combined produced visibility between a quarter mile and a half mile across the area. Snow accumulations were from 3 to 5 inches and wind gusts of 46 mph.

December 18, 2002, 10:24 AM CST – December 19, 3:49 AM CST

6 to 8 inches of snow fell across the area. Light freezing rain or sleet fell early on the 18th, with winds around 25 mph.

February 11, 2003, 9:55 AM CST – February 11, 2003, 6:00 PM CST

A strong arctic front moved through the northern plains, and produced strong northwest winds. Strong winds occurred across the area with gusts of 56 mph. Little snow was associated with the frontal passage, but there was about an inch of fluffy snow on the ground at the time. The worst visibilities were found in open areas. With little falling snow and mostly sunny conditions above the blowing snow layer, it was considered a ground blizzard. Dirt mixed in with the snow, creating dirt/blowing snow mix.

March 8, 2003, 2:54 PM CST – March 9, 2003, 12:00 PM CST

A fairly compact ridge of high pressure brought clear skies and brisk west/northwest winds to eastern North Dakota. High temperatures were only in the single digits above and below zero. The west/northwest winds of 15 to 25 mph with a few gusts to 35 mph with overnight temperatures 10 below to 20 below zero (about 30 degrees below normal). This dropped wind chill temperatures to 40 below to 50 below zero. These extreme wind chill temperatures disrupted public events and services. Some schools cancelled or postponed activities and numerous water main breaks were also reported.

January 24, 2004, 3:25 PM CST – January 26, 2004, 3:15 PM CST

An inverted trough extended into the northern plains from an area of surface low pressure over the central plains. Much of the area received over 6 inches of snow. Wind chills were from 20 to 30 below zero. Many Sunday church services and other activities were cancelled. Most schools closed on Monday, while others started late.

January 26, 2004, 3:30 AM CST – January 31, 2004, 11:59 PM CST

Arctic high pressure built into the northern plains in the wake of the January 24th-26th snowstorm, which dropped heavy snow over all the eastern North Dakota. With subzero temperatures and wind speeds of 10 to 20 mph, wind chills dropped to 40 to 65 below zero on the afternoon of the 27th.

February 10, 2004, 3:24 PM CST – February 11, 2004, 3:50 PM CST

An Alberta Clipper system from Minot, ND and a surface high also built into eastern Montana, aligning a strong surface pressure gradient over central North Dakota. Winds gusted around 35 mph along with 1 to 3 inches of new snow. Along with the snow already on the ground, this made for ground blizzard conditions. Schools were closed on Wednesday in Barnes and Ransom Counties.

March 1, 2004, 10:04 AM CST – March 1, 2004, 9:40 PM CST

An area of surface low pressure tracked near Omaha, NE, with an inverted trough extending northward into the Red River Valley. Temperatures hovered around and above freezing. Areas received roughly 2 to 5 inches of snow along with about ½ inch of sleet or ice. As the system departed the area, north winds increased to 20 to 35 mph, producing near zero visibilities in open country.

June 23, 2004, 12:00 AM CST – June 24, 2004, 11:59 PM CST

An upper level low pressure system parked near Hudson Bay helped produce unusually cold weather for mid-June. Temperature reported ranged from 32 to 37 degrees which produced patchy frost for the mid June growing season. Some sensitive crops, especially over northeast North Dakota, were unable to recover.

August 19, 2004, 12:00 AM CST – August 21, 2004, 11:59 PM CST

Patchy frost occurred over portions of the area throughout these 3 mornings, which was not normal for August. As patchy frost also occurred on June 23rd and 24th, the only summer month that didn't have frost was July. The usual date for a first frost is not until mid to late September. Daily, monthly, and seasonal temperature records were all set. Low temperature ranged from 30 to 38 degrees. Damage to crops was widespread and yet spotty. Crops in lower lying areas were more susceptible to frost than those slightly higher. Some crops, like soybeans, edible beans, and corn, were also more susceptible to frost than root crops such as sugar beets and potatoes. Some crop varieties were also more frost resistant than others. The cool summer and prior frosts put many crops about 2 to 4 weeks behind schedule. The majority of crops that needed warm nights to mature (such as corn or tomatoes) were not expected to make it. North Dakota crop losses were estimated at \$530 million, but crop insurance was expected to offset about \$201 million of this amount, leaving a net loss of about \$329 million. However, this estimate covered summer flooding, drought, and the cool weather. The tourism/resort industry also reported decreased summer revenue. Garden and vegetable farmers were hit hard, with some vegetables not ripening. Leaves on trees turned color early and started falling from trees. The bee industry was also hurt by the cold. ND was the nation's top honey producer in 2002 and was second in 2003. The cold weather meant fewer blossoms and less active bees. In 2003, North Dakota produced 29.6 million pounds of honey worth over \$40 million.

December 11, 2004, 9:20 PM CST – December 12, 2004, 3:33 PM CST

A surface low pressure system tracked from north of Winnipeg (Canada) to the Minnesota arrowhead, bringing the first winter storm of the season. Several light snow events in the days prior to this event had left some snow cover over most of eastern North Dakota and the northwest quarter of Minnesota. 4 to 6 inches of snow depth was reported along a Langdon to Devils Lake to Finley (all ND) to Ada (MN) line. However, the first part of December also brought near-record warmth. Temperatures on Saturday the 11th climbed into the upper 30s to middle 40s, putting a good crust on the snowpack. The above-freezing temperatures held into the early part of Sunday (12th), so the precipitation began as a rain/freezing rain mix. The rain also helped melt some of the snowpack and keep it crusted. As temperatures fell Sunday, any slushy or wet spots turned to ice. Wind speeds also increased as the low pressure system passed through, with many locations reporting gusts over 50 mph. Wind sensors at Hallock, Fisher, St. Vincent, and 8 miles west of Donaldson (all in extreme northwest MN) reported gusts over 58 mph. These strong winds, in addition to some light snow showers, produced whiteout conditions at times. The worst visibilities occurred in the northern red river valley, where trucks were routed off Interstate 29 for a time. Highway departments in other areas urged people to use extreme caution if they had to venture out.

December 30, 2004, 7:39 AM CST – December 30, 2004, 3:00 PM CST

A "hybrid" surface low pressure system moved nearly straight east across the northern plains. It tracked across northern South Dakota to Aberdeen, then toward Bemidji (MN) and Duluth. A strong thermal gradient developed during the day on Thursday (30th), with highs from around 20 near Cando, ND, to around 40 from Forman, ND, to Parkers Prairie, MN. An area of rain over eastern South Dakota moved into southeast North Dakota and west central Minnesota and fell as freezing rain. A good quarter to half inch of ice accumulated across the area. As temperatures rose to the melting point or above by Thursday afternoon, some of the ice melted. This prevented widespread power outages and major travel problems. Even so, quite a few accidents were reported. As the low pressure system moved east, temperatures fell Thursday night. Any slush or wet spots quickly froze, making travel hazardous once again.

December 31, 2004, 3:35 PM CST – January 2, 2005, 12:50 AM CST

This event began on the afternoon of December 31, 2004. This was a more typical "Colorado Low," and it brought some freezing drizzle and snow to portions of eastern North Dakota and the northwest quarter of Minnesota. The surface low tracked from the Kansas area toward western Wisconsin. The way this system set up, an impressive supply of gulf moisture was carried northward, moisture amounts well above normal for the time of year. Temperatures on Saturday (January 1, 2005) showed a strong northwest to southeast gradient, with the Cando (ND) area having a high of zero and the Park Rapids (MN) area around 20F. The freezing precipitation mostly affected the U.S. Highway 10 corridor. Snowfall amounts ranged from 5 to 8 inches along the Canadian border to around 4 inches along U.S. Highway 2. Wind speeds and blowing snow were not a factor in this system. Many county highway departments advised no travel.

January 12, 2005, 10:17 AM CST – January 13, 2005, 5:00 AM CST

The northern plains were split between two areas of surface low pressure, one over the central plains and the other over southern Canada. The new snow was very powdery; therefore it was very susceptible to the wind (and blowing). As the wind did increase, it produced whiteout conditions just west of the Red River Valley. Arctic air also came down behind this system, as temperatures fell to -5F to -10F by midnight on the 12th (temperatures continued to fall into the 13th). With wind speeds gusting up to 45 mph, wind chill temperatures plunged to -40F to -50F. The combination of these factors caused many schools to close for the day on the 13th, especially in the Devils Lake region.

January 13, 2005, 5:35 AM CST – January 15, 2005, 3:03 PM CST

Eastern North Dakota and portions of the northwest quarter of Minnesota ended up in a steady surface pressure gradient between high pressure just to the south and low pressure to the northeast. This produced wind speeds from 10 to 20 mph in combination with very cold temperatures. Daytime highs generally stayed from -5F to -15F while lows ranged from -20F to -35F. Wind chill temperatures ranged from -40F to -60F, which are wind chills in warning criteria.

January 21, 2005, 4:20 AM CST – January 22, 2005 6:53 AM CST

Surface low pressure tracked from southern Alberta, to western North Dakota, into northeast South Dakota, and then into southern Minnesota. A little freezing rain fell south of a Valley City (ND) to Elbow Lake (MN) line. Meanwhile, 4 to 6 inches of snow fell along the Devils Lake (ND) to Fargo (ND) to Wadena (MN) corridor. After the surface low passed through, the wind speeds rapidly increased to gusts up to 50 mph. Whiteout conditions developed Friday afternoon (the 21st) and continued into early Saturday. Initially a winter storm warning was issued for this event, but as it became clear that whiteout conditions would develop, it was upgraded to a blizzard warning. Many schools cancelled early on Friday afternoon, and many evening events were also rescheduled. Hundreds of vehicles were reported in the ditch. Several flights into Hector International Airport (in Fargo, ND) were cancelled. Numerous roads were closed.

November 27, 2005, 12:29:00 PM CST – November 29, 2005, 05:59:00 AM CST

An inverted trough stretched into the Red River Valley, from a low pressure system passing through the central plains. The precipitation began as a mixture of rain and freezing rain, falling quite heavily at times. The most freezing rain fell across southeast North Dakota and portions of west central Minnesota, although lighter amounts did fall further north. Trees and power lines became weighted down with up to an inch of ice in places. As temperatures cooled and wind speeds increased, power lines started to gallop and break in great numbers. The wind speeds increased around the noon hour on 11-28-05 causing blizzard conditions across southeast North Dakota and west central Minnesota. Whiteout conditions continued into the morning (11-29-05). Many schools were closed on both days, especially along and south of Interstate 94 in North Dakota and U.S. Highway 10 in Minnesota. For many schools, these were the first back-to-back day closures since the record winter of 1996-97. Interstate 29 was closed from Fargo to the South Dakota border, Interstate 94 was closed from Jamestown to Fergus Falls, and U.S. Highway 10 was closed from Moorhead to Detroit Lakes.

December 29, 2005, 8:04 PM CST – December 30, 2005, 11:57 AM CST

The freezing rain and snow over Ransom, Sargent and Richland counties continued to move north affecting Barnes and Cass Counties. Up to a quarter inch of freezing rain was reported with snowfall amounts from 4 to 6 inches.

February 16, 2006, 6:00 PM CST – February 18, 2006, 4:00 AM CST

Arctic high pressure built southeast out of western Canada, settling across eastern Montana and the central plains. Eastern North Dakota and the northwest quarter of Minnesota remained on the eastern edge of the surface high, with just enough of a surface pressure gradient to allow wind speeds to stay in the 10 to 15 mph range. On the morning of the 17th, temperatures ranged from -20F to -30 F. Only a bit of recovery occurred during the day, with temperatures peaking about -10F to -15F. This kept wind chill temperatures in the -40F to -60F range.

February 24, 2006, 11:26 AM CST – February 24, 2006, 6:56 PM CST

Snowfall amounts ranged from 6 to 7 inches in northern Barnes and Cass counties to 1 to 3 inches along the south of Interstate 94.

December 30, 2006, 4:46 AM CST – December 31, 2006, 4:21 AM CST

At noon on December 30th, an area of surface low pressure had set up over southern Kansas, with an inverted trough extending north from the low (from near Sioux Falls, SD, to west of Devils Lake, ND). A fairly strong temperature gradient set up across the inverted trough, with Minot, ND, at 16F, Devils Lake at 25F, and Crookston, MN, at 32F. As moisture was transported into the colder air, intense snow bands set up over central North Dakota. By mid Saturday afternoon, the inverted trough had moved into the Red River Valley. However, temperatures still ranged in the low to mid 30s along and east of the valley. The inverted trough remained nearly stationary through midnight, which kept temperatures above freezing over most of west central

Minnesota. The heavier snow bands eventually slid into portions of eastern North Dakota. The colder temperatures took the longest to reach the southern Red River Valley, where rain changed to freezing rain and then to snow. By 3 am on December 31st, the boundary pushed into central Minnesota, and most of the precipitation ended. Snow fall was reported of 10 inches at Starkweather, Fordville, Lakota, and Valley City. There were reports of church services cancelled in some areas on the 31st and reports of many cars in the ditch.

February 3, 2007, 4:47 AM CST – February 3, 2007, 11:51 AM CST

Cool surface high pressure settled into the western and central Dakotas, in the wake of a cold front. By the morning of February 3, temperatures ranged from -25F over southeast North Dakota to around -35F over northeast North Dakota. Along with northwest wind speeds at 10 to 20 mph, wind chill temperatures dipped to -40F to -55F.

February 24, 2007, 8:40 PM CST – February 25, 2007, 4:26 AM CST

A Colorado Low moved across Kansas and into northern Missouri, shifted northeast into Wisconsin. To the north of this low, an inverted trough set up into the Red River Valley. Several distinct bouts of precipitation were focused into southeast North Dakota and the northwest quarter of Minnesota during this event. Precipitation initially broke out during the night of the 23rd as light freezing rain over portions of west central Minnesota, but it quickly switched over to snow. This first bout of snow brought about 6 inches to Grant, Otter Tail, and Wadena counties (MN) by noon on the 24th. Additional bands of snow fell across the area that afternoon, but the heaviest band of snow set up over Barnes, Griggs, and Steele counties, where 6 to 8 inches of snow was reported by 7 pm (24th).

February 27, 2007, 3:36 PM CST – February 28, 2007, 11:59 PM CST

A Colorado Low tracked from northwest Missouri to eastern Wisconsin, while an inverted trough extended back into the Red River Valley. This brought a prolonged period of snow to eastern North Dakota and portions of northwest and west central Minnesota. The snow continued into

March 1st, at which point wind speeds also increased. Blizzard conditions were reported from New Rockford to Cooperstown to Page to Wahpeton/Breckenridge.

March 01, 2007, 0:00 AM CST – March 2, 2007, 2:46 PM CST

The initial winter storm warning for southeast North Dakota was issued on the afternoon of February 27th, while the winter storm warning for the rest of northeast North Dakota was issued early in the morning on February 28th. Therefore this winter storm event covers the end of February into early March. A Colorado Low tracked from northwest Missouri to eastern Wisconsin, while an inverted trough extended back into the Red River Valley. This brought a prolonged period of snow to eastern North Dakota and portions of northwest and west central Minnesota. Many church and school activities were postponed. There were reports of several roofs caving in from the weight of the snow. Snow fall ranged from 10 to 21 inches. The snow continued into the evening of March 1st, at which point wind speeds also increased. Blizzard conditions were reported from New Rockford to Cooperstown to Page to Wahpeton/Breckenridge. Wind speeds increased from the evening of the 1st into the evening of the 2nd, causing whiteout conditions from New Rockford to Cooperstown to Page to Wahpeton/Breckenridge. Many counties advised no travel, due to zero visibility and snow drifts on roads. Many snow plows were pulled, as they could not keep up with the blowing and drifting snow. Interstate 94 was closed from Bismarck to Fargo around 5 pm on the 2nd, and remained closed through the morning of the 3rd.

January 17, 2008, 9:00 PM CST – January 18, 2008, 12:00 PM CST

A cold front pushed through the area Thursday evening. The combination of cold temperatures (-10F to -20F) and winds (15 mph to 25 mph) created dangerous wind chills (-40F to -50F) across the area until the winds relaxed by Friday afternoon.

January 29, 2008, 3:00 AM CST – January 30, 2008, 12:00 PM CST

A surface low tracked across North Dakota and into north central Minnesota on Monday, January 28th. A strong surface pressure gradient set up over eastern North Dakota and the northwest quarter of Minnesota as the low pushed into southwest Ontario Monday night. Cold air rushed into the area by Tuesday morning, which dropped temperatures to five below to twenty below zero, with the coldest temperatures in the Devils Lake region. Temperatures remained steady or continued to fall during the day Tuesday, with wind chills ranging from 40 below to 50 below zero. Tuesday night lows fell to the 20s below zero, with the coldest lows again around the Devils Lake region. High pressure finally built into the area on Wednesday afternoon, which allowed wind speeds to relax. Some schools cancelled classes on Tuesday, while several other schools started 2 hours late.

February 8, 2008, 3:37 PM CST – February 9, 2008, 12:00 PM CST

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. 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.

February 9, 2008, 6:00 PM CST – February 10, 2008, 12:00 PM CST

After the ground blizzard conditions that affected eastern North Dakota during the day (9th), dangerous wind chills of 40 below to 50 below zero developed. By the morning of the 10th, temperatures alone dropped to 20 below to 30 below zero. Surface high pressure moved over the area by noon, allowing wind speeds to fall below 10 mph. Power was lost in the St. Thomas, Crystal, Edinburg, and Hoople areas around 4 am CST (10th). By the time it was restored around 7:45 am CST, residents reported that the temperatures inside their homes had fallen to around 60 degrees.

February 13, 2008, 3:58 AM CST – February 14, 2008, 3:44 AM CST

A low pressure system tracked from southwestern North Dakota and northeastern South Dakota into southwestern Minnesota on Wednesday February 13th. A moderately heavy snow band (4 to 7 inches) developed across extreme northwest and north central North Dakota into the Devils Lake Basin. The heavy snow combined with east-northeast winds of 20 mph gusting to 35 mph by the mid-afternoon, to produce visibilities of one-half mile or less. Temperatures dropped into the 5 below to 15 below zero range through the late afternoon and early evening, and wind chills fell to 25 below to 40 below zero. The snow band progressed east-southeast into west central Minnesota, but was less intense. Some church and school activities were cancelled on Wednesday. An 89 year old man and his 83 year old wife accidentally drove into a ditch Wednesday evening about a mile from their home. They both attempted to walk the remaining distance home. They were luckily found by neighbors fairly quickly, but both of them were treated for frostbite.

February 19, 2008, 4:00 PM CST – February 20, 2008, 4:00 AM CST

Record or near record cold air poured into eastern North Dakota and northwest Minnesota Tuesday (February 19th) and Tuesday night. The combination of moderate northerly winds of 15 to 25 mph and very cold temperatures produced wind chills of 40 below to 50 below zero.

May 27, 2008, 0:00 AM CST – May 27, 2008, 7:00 AM CST

Surface high pressure built into the region, producing another late May freeze.

December 13, 2008, 4:03 AM CST – December 15, 2008, 0:04 AM CST

A potent surface low pressure system moved out of Colorado and tracked northeast to the Minneapolis area. This created a strong temperature gradient across the northern plains, with Devils Lake at 15 below zero and the Minneapolis area around 30 above. As the system intensified over eastern Minnesota, northwest winds began to gust to around 50 mph with wind chills colder than 40 below zero. Snow 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 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.

December 15, 2008, 4:01 AM CST – December 15, 2008, 12:00 PM CST

Northwest winds continued after blizzard due to surface high pressure building in behind the departing low. Low temperatures dipped to 10 below to 20 below zero with wind chills from 40 below to 50 below zero.

December 19, 2008, 4:01 AM CST – December 20, 2008, 11:36 AM CST

An inverted trough slowly crossed eastern North Dakota and northwest Minnesota, dropping about 4 to 6 inches of snow along with 25 to 35 mph wind speeds.

December 20, 2008, 3:18 PM CST – December 21, 2008, 11:04 AM CST

After the winter storm event northwest winds remained brisk as surface low pressure intensified over the Great Lakes. With temperatures remaining below zero, wind chill readings ranged from 40 below to 50 below zero.

December 29, 2008, 8:51 PM CST – December 30, 2:40 PM CST

Surface low pressure tracked across South Dakota, spreading a swath of heavy snow along the Interstate 94 corridor. Most locations across this area picked up 8 to 14 inches of snow.

January 4, 2009, 1:00 AM CST – January 4, 2009, 7:00 PM CST

Arctic air returned to the Northern Plains and Upper Midwest. Brisk westerly winds of 10 to 20 mph created dangerously cold wind chills across eastern North Dakota.

January 9, 2009, 9:32 AM CST – January 9, 2009, 2:45 PM CST

A narrow band of 6 to 8 inches of snow fell across southwest Benson County, western Eddy County, southwest Griggs County, and northwest Barnes County.

January 11, 2009, 3:00 PM CST – January 12, 2009, 2:50 PM CST

Two to 5 inches of snow fell from just west of Devils Lake down into the southern Red River Valley. The most snow, 4 to 5 inches, fell over western Barnes County, Ransom County, and western Sargent County. As north winds increased wind gusts to around 40 mph caused blizzard conditions in open country.

January 13, 2009, 11:00 AM CST – January 16, 2009, 2:00 AM CST

Very cold arctic air sank into the Northern Plains. The light winds of 5 to 15 mph at times caused wind chills to run 40 to 60 below zero across much of eastern North Dakota.

February 8, 2009, 3:44 PM CST – February 10, 2009, 00:00 AM CST

A Colorado Low tracked from northeast Colorado into west central Minnesota. 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 the 9th, and then began late on the 10th. Most areas did not receive their regular mail delivery.

February 26, 2009, 8:42 AM CST – February 26, 2009, 6:00 PM CST

A surface low passed to the south over the central plains, but a strong upper level disturbance and upper jet combined to produce winter storm conditions along and south of Interstate 94 in North Dakota. Four to 16 inches of snow fell across the area, along with north winds of 20 to 30 mph. The most snow fell across southern Richland and Sargent counties, where amounts ranged from 10 to 16 inches. Several schools closed while others only held classes for a portion of the day. Snowplows were pulled off the roads in far southeast North Dakota, as they could not keep up with the snowfall rates.

March 9, 2009, 2:56 PM CST – March 11, 2009, 5:00 AM CST

A Colorado Low located over the central Rockies tracked northeast to northern Wisconsin. One swath of heavier snow fell, mainly from Jamestown (ND) to Mayville (ND) to Red Lake Falls (MN). Snowfall amounts of 6 to 8 inches fell along this narrow band. Outside of this band, about 2 to 4 inches of snow were reported. As the system wrapped up on the 10th, a much wider swath of snow fell, along with increasing north winds. The most snow was reported along the initial snow band, with total amounts ranging from 10 to 13 inches. Outside this area, total snowfall amounts ranged from 4 to 8 inches. Maximum north wind gusts during the height of the blizzard ranged from 40 to 50 mph. Interstate 94 was closed from Jamestown to Fargo as were all of Interstate 29 in eastern North Dakota. The wind and snow produced drifts up to 10 feet high in some areas. Most schools closed early on Monday (9th), then remained closed for the next two days. The Grand Forks and Fargo airports were also closed.

March 29, 2009, 2:27 PM CST – March 31, 2009, 9:00 PM CST

A Colorado Low took shape over northeast Colorado and tracked slowly to the northeast, reaching the arrowhead of Minnesota. As the low intensified, north-northeast winds became rather gusty, and made travel almost impossible. Nearly two feet of snow fell over central Wilkin County (MN). Snowfall amounts greater than a foot were very common along and south of Interstate 94 in North Dakota and Highway 10 in Minnesota. The snow had high moisture

content, with over 2 inches reported over central Wilkin County. This storm, in combination with the other March storms, brought two new monthly records to the Fargo-Moorhead area. The snowfall total, 28.1 inches, broke the previous record of 26.2 inches set in 1997. The precipitation total, 4.62 inches, broke the previous record of 2.83 inches set in 1882. The snow and wind on the 31st resulted in the closure of Interstate 29 from Grand Forks to the South Dakota border. No travel was advised across most of the warning area. Many schools also closed on the 30th and 31st.

October 14, 2009, 8:26 PM CST – October 15, 2009, 6:00 AM CST

An early season storm system brought a mix of rain and snow to eastern North Dakota. Most of the precipitation fell as rain, as surface temperatures near the Red River Valley warmed up to around 40 degrees. However, just to the west of the Red River Valley, across the Dazey, Valley City, and Lisbon areas, temperatures were about ten degrees colder, and most of the precipitation fell as slushy snow. Six inches of snow fell at Lisbon and Litchville and 7.5 inches fell in Valley City. The heavy, wet snow broke many tree branches and power lines, which resulted in sporadic power outages for 1500 Valley City residents. Dozens of vehicles slid into the ditch along Interstate 94 in Barnes County.

5.10 Shortage or Outage of Critical Materials or Infrastructure

Characteristics

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

Disrupting critical materials supply system could severely diminish supplies, hurting the health and safety of the residents in Barnes County. Critical materials or infrastructure shortages and outages are often related to other hazards.

Shortages of critical energy supplies can cause:

- Widespread and prolonged electrical power failure, which impacts both day-to-day and emergency communications capability.
- A lack of transportation fuels, causing surface movement gridlock and disruption of commerce.
- Diminished supplies of heating fuels during winter. This could cause severe economic impact on the general public, because they would be forced to seek alternate, possibly more costly, energy sources. Such energy shortages will also impact emergency public health and safety services.
- A lack of medical supplies, especially vaccines, antibiotics, and anti-viral medications, pose a public health and safety threat.
- Private hoarding, compounding a shortage problem.
- A lack of adequate food, water, and shelter.

Every hazard, natural or manmade, can cause a shortage or outage of critical materials or infrastructure. According to the 2014 NDMHMP, the public relies upon utility, communication, and fuel services for everyday life and basic survival. Many in North Dakota depend on 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 power companies through overhead or buried lines. An unplanned outage is described as an outage occurring without warning from outside causes, such as severe weather. Sustained power outages are outages lasting longer than five minutes. Momentary outages are shorter than five minutes. The FEMA Standard Values for Loss of Services for Utilities and Roads/Bridges states that the economic impact of complete loss of electrical services is \$126 per person per day.

Homes and businesses are heated with fuels such as 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 the heating systems. Telephone, cellular telephone, and internet services are provided by several local and national companies. Privately-owned gas stations are located throughout the county.

History

Power outages in Barnes County are the primary incidents involved in shortage or outage of critical materials or infrastructure. Planned outages are described as outages put into place intentionally by the utility for maintenance purposes. An unplanned outage is described as an outage caused without warning from outside causes, such as severe weather. A momentary outage is described as an outage lasting less than five minutes, while a sustained power outage is described as an outage lasting five minutes or more. Electrical power in the county is provided by Ottetail Power Company in Barnes County outside the city of Valley City. Valley City maintains its own municipal electric service. Table 5.10.1 summarizes the history of outages in Barnes County.

Table 5.10.1 –January 2010 to May/June 2014 Momentary & Sustained Power Outages

| Jurisdiction | Momentary Power Outage | | Sustained Power Outage | | Total Outage Time | Total Number of Outages |
|--------------|---------------------------------|-------------------|---------------------------------|-------------------|-------------------|-------------------------|
| | Length of Time (Hr., Min. Sec.) | Number of Outages | Length of Time (Hr., Min. Sec.) | Number of Outages | | |
| Dazey | 0:46:34 | 84 | 25:38:02 | 10 | 26:24:36 | 94 |
| Fingal | 0:13:42 | 90 | 30:10:46 | 25 | 30:24:28 | 115 |
| Kathryn | NA | NA | NA | NA | NA | NA |
| Leal | 0:17:16 | 38 | 23:59:18 | 14 | 24:16:34 | 52 |
| Litchville | 0:13:16 | 94 | 12:26:39 | 13 | 12:39:55 | 107 |
| Nome | NA | NA | NA | NA | NA | NA |
| Oriska | 0:17:02 | 39 | 41:25:46 | 18 | 41:42:48 | 57 |
| Pillsbury | 0:05:10 | 15 | NA | NA | 0:05:10 | 15 |
| Rogers | 0:12:17 | 33 | 13:51:24 | 13 | 14:03:41 | 46 |
| Sanborn | 0:02:46 | 12 | 8:34:22 | 4 | 8:37:08 | 16 |
| Sibley | 0:11:14 | 32 | NA | NA | 0:11:14 | 32 |
| Valley City | NA | NA | NA | NA | NA | NA |
| Wimbledon | 0:08:54 | 17 | 21:51:35 | 15 | 22:00:29 | 32 |
| Total | 2:28:11 | 454 | 177:57:52 | 112 | 180:26:03 | 519 |

Note: Outage data was available for Valley City as the city operates its own municipal electric service. Outage data was not available for Kathryn or Nome.

Source: Otter Tail Power Company

The FEMA standard value for loss of service for electric utility is calculated to have an economic impact of \$126 per person per day with a complete loss of service. According to data of power outages provided by Otter Tail Power Company, a total of 454 momentary power outages were reported between January 2010 and May/June 2014 in Barnes County resulting in a total outage time of two hours, 28 minutes, and 11 seconds, or an average of 20 seconds per incident. A total of 112 sustained power outages were reported between January 2010 and May/June 2014 in Barnes County resulting in a total outage time of 177 hours, 57 minutes, and 52 seconds, or an average of one hour, 36 minutes, and 32 seconds per incident. When accounting for both momentary and sustained outages, a total of 519 power outages were reported in Barnes County between January 2010 and May/June 2014 resulting in a total power outage time of 180 hours, 26 minutes, and three seconds, or approximately 8.5 days. The total economic impact of power outages in Barnes County between January 2010 and May/June 2014 is \$11,851,686. This data does not include all power outages as outages were reported at Eckelson, which is not an incorporated jurisdiction in Barnes County.

Road closures resulting from adverse weather or other means of blockage are also an incident of shortage or outage of critical materials or infrastructure in Barnes County. Roads receiving funding from the Federal Highway Administration (FHA) do not qualify for FEMA funding. Table 5.10.2 summarizes the history of blocked roads in Barnes County for roads eligible for FEMA funding.

Table 5.10.2 – 2011 Barnes County Non-Federal Aide System Road Closure List

| Road | Location | Damage | Date Closed | Date Opened | # of Days |
|--------------|---|--------------------------|-------------|-------------|-----------|
| 0211N | Sec 11/12 & 13/14 T141N-R60W | Inundation of roadway | 4/9/2011 | 4/22/2011 | 13 |
| 0227S | Sec 31/32 T140N-R57W | Inundation of roadway | 4/22/2011 | 4/26/2011 | 4 |
| 0217S | Sec 13 T139N-R59W & Sec 14 T139-R58W | Inundation of roadway | 4/6/2011 | 4/9/2011 | 3 |
| Bridge | Sec 16/21 T142N-R56W | Box culvert washout | 4/22/2011 | 5/4/2011 | 12 |
| Total | | | | | 32 |

Source: Barnes County Highway Department

The FEMA standard value for loss of road/bridge service is calculated to have an economic impact of \$38.15 per vehicle per hour. According to the Barnes County Highway Department, a total of 14 roads and one bridge experienced blockage between 2010 and 2014. Only three of these roads and one bridge, as shown in Table 5.10.2, experienced blockage and were eligible for FEMA funding, resulting in a total outage of 32 days. However, the traffic volume on each road is needed to calculate the economic impact for loss of road/bridge service. This data is not available for the FEMA eligible roads in Barnes County.

According to the Barnes County Highway Department, the total number of days outages of roads occurred from blockage in the county was 5,671 days, not considering FEMA funding eligibility.

Quantitative data regarding other types of shortage or outage of critical materials or infrastructure, or shortage of food and medical supplies, is not included. Barnes Rural Water District and Dakota Rural Water District provide water to the county and its jurisdictions, and have backup generators to maintain water service during times of power outage.

Probability and Magnitude

The probability of the shortage or outage of critical materials or infrastructure hazard in Barnes County is hard to determine as the cause can either be natural or manmade. Power outage frequency, as shown in Table 5.10.1, and the frequency of outages of roads, as shown in Table 5.10.2, results in a 100 percent probability outages of power and roads will occur in the future. The lack of data for other critical materials or infrastructure results in an inability to calculate a probability for the hazard. However, during jurisdictional meetings, city council members and meeting participants said there is always a chance any jurisdiction can experience power outages, blocked roads, and a shortage of critical materials from other hazards. The probability of outages is much lower in jurisdictions with redundancy in connections to the power grid; availability of snow removal equipment and road maintainers; grocery stores and gas stations; and other resources to sustain the daily routine of people's lives. Calculating the probability of shortage or outage of critical materials or infrastructure pertaining to water systems, and food or fuel supplies, is difficult to determine due to the lack reporting and collection of data when such incidents occur.

The magnitude for shortage or outage of critical materials or infrastructure can range from minimal to severe, depending on the location, length of shortage or outage, infrastructure affected, the number of people affected, and weather conditions. A minimal magnitude of shortage or outage of critical materials or infrastructure would be momentary loss of power or temporary blocking of roads from heavy snow. An incident of shortage or outage of critical materials or infrastructure severe in magnitude would involve a sustained power outage lasting several days or weeks, closure of a road for a prolonged period of time, or outage of water, fuel, or food lasting several days.

Risk Assessment

Table 5.10.3 shows the risk assessment as determined by individual jurisdictions and the planning committee. The risk assessment methodology can be found on page 5-3 of Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 5.10.3 – Risk Assessment Summary Shortage or Outage of Critical Materials or Infrastructure Scored Chart

| Shortage or Outage of Critical Materials or Infrastructure | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|--|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 3 | 4 | 4 | 3 | 2 | 12 |
| Dazey | 3 | 2 | 4 | 3 | 2 | 10 |
| Fingal | 3 | 2 | 3 | 3 | 1 | 10 |
| Kathryn | 3 | 2 | 2 | 2 | 2 | 7 |
| Leal | 3 | 3 | 4 | 4 | 2 | 12 |
| Litchville | 2 | 1 | 2 | 2 | 2 | 5 |
| Nome | 3 | 4 | 3 | 3 | 1 | 12 |
| Oriska | 2 | 2 | 2 | 2 | 1 | 7 |
| Pillsbury | 2 | 2 | 2 | 2 | 2 | 6 |
| Rogers | 3 | 3 | 3 | 3 | 2 | 10 |
| Sanborn | 4 | 4 | 4 | 3 | 1 | 14 |
| Sibley | 4 | 2 | 3 | 4 | 1 | 12 |
| Valley City | 3 | 2 | 3 | 4 | 2 | 10 |
| Wimbledon | 4 | 3 | 3 | 4 | 2 | 12 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|----------------------|
| Seasonal Pattern | Spring, Fall, Winter |
| Duration | 6 months |
| Speed of Onset | Slow |

Capabilities of and Vulnerabilities to Jurisdictions

According to the 2014 NDMHMP, the risk to jurisdictions in Barnes County from shortage or outage of critical materials or infrastructure was ranked moderate based on the number of people affected. In the state plan, the rating of “moderate” is for populations of 9,001 to 16,000, based on the 2010 U.S. Census information. The 2010 U.S. Census population for Barnes County was 11,066.

Capabilities and vulnerabilities were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet

Barnes County

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages cause complete shutting down of the city • Vulnerable individuals impacted from loss of electric and medical supplies • Reduced mobility • Economic impact if outage of utilities occurred and summer/recreation population left • Roads can become blocked, but not long enough to result in outages of infrastructure for emergency services or economy activity • Increased crime from looting • Loss of an estimated \$9,760,202 in economic activity |
| Frequency | 4 | <ul style="list-style-type: none"> • Momentary and Sustained outages occur multiple times each year • Approximately 115 sustained and 474 momentary outages between 2010 and May/June 2014 • Around 15 to 20 leaks occur each year to water pipes but no total outages to jurisdictions has occurred |
| Likelihood | 4 | <ul style="list-style-type: none"> • County clears highways • State maintains I-94 • Generators installed for critical facilities and infrastructure for some areas • Cannot bury power lines due to terrain and unstable soil in certain areas • Geographical location in the county may impact the length of outage for each jurisdiction |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of grocery store and/or gas stations in many smaller jurisdictions • More vulnerable: One hospital in the county • More vulnerable: Vulnerable population relying on electricity to power oxygen tanks and other health needs • More vulnerable: Lack of buried power lines and plans to improve existing electric infrastructure • More vulnerable: Elderly population in remote areas due to lack of alternative housing options • More vulnerable: Long response times from emergency services • Less vulnerable: Locally grown food by residents • Less vulnerable: Barnes County Water Resource District • Less vulnerable: Lack of citizens on individual wells and presence of regional water systems |
| Capability | 2 | <ul style="list-style-type: none"> • Lacks technical, administrative and financial resources • Relies on regional, state, and other agencies for assistance • Does not have resources to accomplish projects independently • Active emergency management department with education and outreach available on the departments website |

Vulnerabilities to County-Owned Buildings and Property

County-owned buildings and property are vulnerable to shortage or outage of critical materials and infrastructure as a result of other natural and manmade disasters. Power outages may occur due to downed power lines resulting from summer or winter storms, buildings can become flooded due to sewer backups from loss of power, water main breaks, traffic accidents, or overland flooding due to clogged drainage systems and heavy rain. Some buildings can become uninhabitable if an incident were to occur during winter months with extreme cold or summer months with windstorm. Structures are not vulnerable directly, but damage can result from occurrences of other hazards. Chapter 4 provides a summary of county and city owned property in Barnes County.

Vulnerabilities of Critical Facilities and Infrastructure

Disruptions to critical facilities and infrastructure can occur due to natural and manmade disasters, human error, low supplies of fuel or other resources, and failures of mechanical systems. The access to critical materials such as medical supplies, medications, food, and fuel can be prolonged from blocked roads that do not allow residents to travel. Transportation mobility for emergency services could be eliminated depending on the road and/or transportation mode impacted.

Vulnerabilities to New and Future Development

The size and intensity of new and future development can have a varying impact on the demand for electricity, food, water and medical supplies. As populations increase, utility providers may have to add capacity at strategic points to provide service to a growing number of customers and upgrade other related infrastructure, such as power lines. The city of Barnes is the only jurisdiction in Barnes County with projected population increases through 2030. With an addition of roughly 31 residents by 2030, projected population growth should be manageable to avoid an overload of the electrical system and mitigate power outages.

Data Limitations and Other Key Documents

The shortage or outage of critical materials or infrastructure hazard is a result of other natural or man-made hazards, and, therefore, it is not feasible to quantify an accurate amount of losses from the hazard. In addition, limited data is documented in Barnes County.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- Barnes County Emergency Operations Plan
- North Dakota Emergency Operations Plan, Shortage of Critical Materials Annex
- North Dakota Energy Emergency Response Plan Update, N.D. State Energy Office, 2013

Hazard Profile and History

According to data of power outages provided by Otter Tail Power Company, between January 2010 and May/June 2014, the jurisdictions in Barnes County experienced total power outages of 180 hours, 26 minutes, and three seconds, or approximately 8.5 days. The FEMA standard value for loss of service for electric utility is calculated to have an economic impact of \$126 per person per day with a complete loss of service. The total economic impact of power outages in Barnes County between January 2010 and May/June 2014 is \$11,851,686. This data does not include all power outages in the county.

According to the Barnes County Highway Department, the total number of days roads were blocked in the county was 5,671 days, regardless of road type and/or funding source. The FEMA standard value for loss of road/bridge service is calculated to have an economic impact of \$38.15 per vehicle per hour. A total of 14 roads and one bridge experienced blockage between 2010 and 2014. Only three of these roads and one bridge, as shown in Table 5.10.2, experienced blockage and were eligible for FEMA funding, resulting in a total outage of 32 days.

According to the 2010 Barnes County MHMP, the following incidents of the shortage or outage of critical materials or infrastructure hazard occurred in Barnes County in 2008 and 2009.

- During 2008 there was a shortage of diesel fuel in the region, making it hard for gas stations to keep up with the demand.
- The sewer system in Valley City was overloaded during the flooding of 2009. Residents were asked to conserve water use in order to prevent a complete failure of the system. The conserve water restriction was in place for over two weeks due to the high level of the river.
- According to a technician with Barnes Rural Water District, the district experiences 15 to 20 leaks per year, lasting up to half a day at the most.
- Dakota Rural Water Users has never recorded outages of water for communities. Pipes have burst in the past and there have been instances of shortage to individual customers such as farmsteads.

5.11 Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

Characteristics

A transportation accident, as defined by the 2014 NDMHMP, 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 reach a magnitude that overtaxes the response abilities of local resources. In most disasters death and injury represent one of the hazard impacts, in transportation accidents mass casualties are often the primary impact and focus of the event.

Transportation accidents occur with little or no warning. Cargo trains, buses, large-truck traffic, other highway vehicles, and passenger and cargo airplanes pose the highest risk. Due to the sparse population in Barnes County, even an incident involving a small number of deaths and/or injuries could overwhelm local resources.

Vehicle: Motorized passenger, cargo off-road and water craft.

Railroad: Passenger trains or cargo trains such as BNSF or CPR.

Bus: School bus transportation would be the most likely event. Tourist buses travel through Barnes County. No commercial service.

Air Craft: Small passenger, spraying, others traveling over the area

Transportation incidents occur with little or no warning. They involve a large number of people and require special types of equipment and emergency medical personnel. Such accidents not only affect people with significant numbers of deaths/injuries, but also cause traffic problems, property damage, or even an explosion. The probability is increased during winter storms, periods of poor visibility from snow, smoke, or dust; festivities with more opportunities for drinking and driving; and times of increased traffic volume. The agricultural economy of the region also increases the opportunity for the release of hazardous materials in a transportation accident.

History

According to the 2014 NDMHMP, there have been no State Executive Orders or federal declarations dealing with transportation accidents in North Dakota. Accidents typically occur on major roadways and highways that require emergency services and can result in inconveniently long travel times for the general public and hinder economic activity.

History on transportation accidents was provided by the N.D. Department of Transportation. A total of 1,581 accidents were recorded between 2009 and 2013 in Barnes County. Of the 1,581 crashes, 1,298 involved property damage only, 273 crashes involved injuries, and 10 involved fatalities. Damage to property and crops was not available in the data provided. The data did not include reports of transportation accidents involving aircraft, trains or other modes of transportation aside from automobiles. Details regarding recent transportation accidents are shown in the Hazard Profile and History section at the end of this chapter.

According to the 2014 NDMHMP, in 2011, there were approximately 309 crashes in Barnes County resulting in 71 injuries, one fatality and approximately \$6,039,436 in injury costs.

Probability and Magnitude

According to the data provided by the N.D. Department of Transportation, 1,581 incidents of transportation accidents have occurred in Barnes County between 2009 and 2013, resulting in an average of 395 accidents per year, or a 100 percent probability of the occurrence of an accident. In terms of magnitude, smaller and less severe accidents occur more frequently. The probability of transportation accidents varies by seasons and local weather patterns.

Since the number of fatalities from transportation accidents in Barnes County was low, the magnitude can be expressed qualitatively. According to the 2014 NDMHMP, transportation accidents can be classified as high frequency, low impact versus low frequency, high impact. Incidents involving buses or plane crashes can be classified as high magnitude events due to the potential to overwhelm local emergency services and the limited capacity of medical facilities in Barnes County. In Barnes County, the magnitude of transportation accidents can be classified as low frequency, high impact.

Risk Assessment

Table 5.11.1 shows the risk assessment as determined by individual jurisdictions and the planning committee. The risk assessment methodology can be found in Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction’s impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction’s capabilities to respond to the hazard.

Table 5.11.1 – Risk Assessment Summary Transportation Accident Scored Chart

| Transportation Accident | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|--------------------------------|---------------|------------------|-------------------|----------------------|---------------------|--------------|
| Barnes County | 4 | 3 | 4 | 3 | 2 | 12 |
| Dazey | 3 | 2 | 3 | 2 | 2 | 8 |
| Fingal | 4 | 3 | 4 | 4 | 1 | 14 |
| Kathryn | 1 | 2 | 2 | 2 | 1 | 6 |
| Leal | 4 | 2 | 3 | 4 | 2 | 11 |
| Litchville | 1 | 1 | 1 | 2 | 3 | 2 |
| Nome | 2 | 2 | 3 | 3 | 2 | 8 |
| Oriska | 4 | 2 | 3 | 3 | 2 | 10 |
| Pillsbury | 4 | 2 | 3 | 3 | 1 | 11 |
| Rogers | 3 | 2 | 4 | 4 | 1 | 12 |
| Sanborn | 4 | 2 | 4 | 4 | 1 | 13 |
| Sibley | 3 | 2 | 2 | 3 | 1 | 9 |
| Valley City | 4 | 4 | 4 | 4 | 1 | 13 |
| Wimbledon | 4 | 3 | 4 | 4 | 2 | 13 |

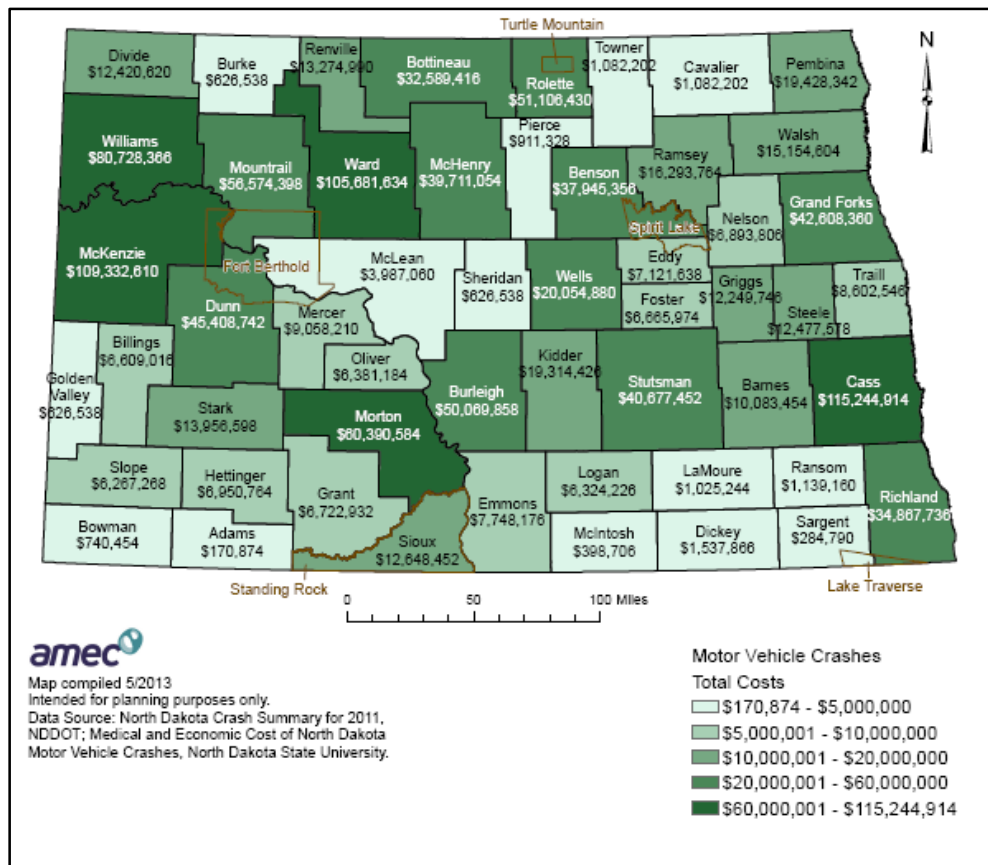
(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|------------------|------------------|
| Seasonal Pattern | None |
| Duration | Hours to 2 weeks |
| Speed of Onset | No warning |

Mapping

Figure 5.11.1 illustrates the 2011 motor vehicle crashes by county in North Dakota. Barnes County reported approximately \$10,083,454 in costs associated with vehicle crashes.

Figure 5.11.1 – 2011 Motor Vehicle Crashes Costs per North Dakota County



Source: North Dakota Department of Emergency Services

Capabilities of and Vulnerabilities to Jurisdictions

Most jurisdictions in the east and north portions of the county scored transportation accident above 10 which is reflective of the increase in truck and train traffic due to economic activity. Capabilities and vulnerabilities were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined

future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Potential for loss of life and economic activity • Strain on local resources due to the limited number of ambulances and first responders • Release of hazardous material can occur if an accident involves a truck, plane, train or farm equipment |
| Frequency | 4 | <ul style="list-style-type: none"> • Frequency of transportation accidents is high due to the presence of Interstate highway and numerous state highways • Plane crashes are occasional occurrences due to farmers using planes for crop dusting |
| Likelihood | 4 | <ul style="list-style-type: none"> • Transportation accidents are highly likely in the future due to an increase in chemicals being used in the agriculture sector and increased traffic on county highways • More economic activity from rapid growth throughout the state and spillover from oil activity in the west |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Response times for emergency services are prolonged due to rural nature of the county • More vulnerable: Lack of road signage for navigation of roads by emergency services |
| Capability | 2 | <ul style="list-style-type: none"> • Active county commission • Contract for engineering, planning, and grant writing. • GIS services provided by the state • Relies on regional, state and other agencies for emergency assistance • County-wide mutual aid agreement • Active emergency management department with education and outreach available on the department’s website • Maintains capital improvements project list and project funding sources |

Vulnerabilities to County-Owned Buildings and Property

County-owned property should not be affected by transportation accidents except in an instance where a train derailed or vehicle crashes into a building. Should an accident where a vehicle crashed into a county-owned building occur, damage could exceed hundreds of thousands of dollars, depending on the structure impacted. A summary of city- and county-owned buildings and property in Barnes County is provided in Chapter 4.

Vulnerabilities of Critical Facilities and Infrastructure

Like county-owned buildings, critical facilities and infrastructure should not be affected by transportation accidents, except in rare occurrences. Vulnerabilities could include a closure of a major transportation

artery or primary route due to an accident, which can block emergency services access. A transportation accident can disrupt power lines if it occurred on a highway where power lines were in close proximity.

Vulnerabilities to New and Future Development

New and future development could result in increased traffic related to residential development or development of industrial areas. Any additional traffic will increase the probability of minor, moderate or major transportation accidents.

Data Limitations and Other Key Documents

A data limitation relating to transportation accidents is the lack of geographic details where the accidents are occurring. Without this knowledge, allocating resources and funding for mitigation of the hazard is challenging. Transportation accidents and related impacts vary depending on the jurisdiction and the mode of transportation involved. Some accidents, especially those on farmsteads involving equipment, trucks, cars and aircraft, may not be reported. This data limitation makes understanding the true impact and formulating a probability for transportation accidents difficult. If data was provided on the route schedules for cargo trains, industrial trucking patterns and times of the year when aircraft is used for agricultural purposes, it would aid in quantifying the potential for transportation accidents and allow local jurisdictions to plan for the hazard.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- Barnes County Emergency Operations Plan
- North Dakota Emergency Operations Plan, Transportation Annex
- TransAction II, North Dakota's Statewide Strategic Transportation Plan
- North Dakota Highway Safety Plan

Hazard Profile and History

Table 5.11.2 provides a summary of transportation accidents in Barnes County with data provided by the N.D. Dept. of Transportation. Detailed accounts of transportation accidents from the 2010 Barnes County MHMP and newspaper articles are found after Table 5.11.2. Figure 5.11.2 shows the transportation network in North Dakota.

Table 5.11.2 – 2009 to 2013 Barnes County Transportation Accidents

| Year | Property Damage Only (PDO) | Injury Crashes | Total Injuries | Fatal Crashes | Total Fatalities | Total Crashes | Source |
|------|----------------------------|----------------|----------------|---------------|------------------|---------------|------------------------------|
| 2009 | 295 | 54 | 77 | 1 | 1 | 350 | N.D. Dept. of Transportation |
| 2010 | 239 | 52 | 71 | 1 | 1 | 292 | N.D. Dept. of Transportation |
| 2011 | 260 | 48 | 3 | 1 | 1 | 309 | N.D. Dept. of Transportation |
| 2012 | 219 | 46 | 74 | 3 | 3 | 268 | N.D. Dept. of Transportation |
| 2013 | 285 | 73 | 106 | 4 | 6 | 362 | N.D. Dept. of Transportation |
| | 1,298 | 273 | 331 | 10 | 12 | 1,581 | |

Source: N.D. Department of Transportation

2010 Barnes County MHMP

1988 A family of six died in a car/train accident.

Newspaper Articles

June 2, 2010 The rollover of a semi-tractor trailer near Pillsbury on 6/1/10 drew a hazardous materials team to the scene. Farm chemicals carried by the vehicle never spilled. The truck rolled over in a ditch on State Highway 32 about a mile south of Pillsbury. The driver was treated for minor injuries. (Source: Valley City Times-Record)

July 22, 2010 One-vehicle accident on 7/21/10 on I-94 westbound between mile markers 276 and 278. One woman was transported to an unknown hospital for injuries. (Source: Valley City Times-Record)

October 27, 2010 A rollover was reported near the Oakes Interchange on I-94. One person was taken to a hospital by ambulance. (Source: Valley City Times-Record)

November 18, 2010 One person critically injured in a three-vehicle accident on I94 at mile marker 299. (Source: Valley City Times-Record)

January 26, 2011 Two vehicle accident. Due to speed and icy conditions a vehicle slid through an intersection with a yield sign on 7th Ave NW, the right side of his car was struck by another vehicle, the first vehicle spun and went into a snowbank. (Source: Valley City Times-Record)

October 18, 2011 A 3-year-old boy was killed in an accident near Spiritwood. According to the sheriff the boy had been playing in a parked truck when it slipped out of gear. The boy fell from the vehicle and it rolled over him. He was dead at the scene. (Source: Valley City Times-Record)

December 27, 2011 Seven railcars carrying soybeans went off the tracks near Valley City. Cause not determined. No hazardous material was being transported. (Source: Valley City Times-Record)

February 21, 2012 A blast of winter weather that blew through the region caused 17 vehicles to slide into the ditch in or near Barnes County, as well as five two-car accidents. Two vehicles collided on State Hwy 1 about six miles south of the interstate. The driver of the Grand AM that crossed the centerline into southbound traffic was dead at the scene. The other driver and four passengers were injured. (Source: Valley City Times-Record)

February 27, 2012 One person killed in a single vehicle accident. The vehicle entered the ditch and continued southbound before striking an approach and being sent airborne. The truck landed south of the approach and struck a utility pole with its front-left corner causing it to spin and roll. The driver was taken to Mercy Hospital, then airlifted to Sanford Hospital in Fargo where he died of his injuries. (Source: Valley City Times-Record)

March 5, 2012 In all, 29 vehicles slid into ditches and interstate medians and seven rollovers were reported in Barnes County. Valley City Fire Department rescue squad, Barnes County Sheriff's office, Barnes County Ambulance and the ND Highway Patrol responded to a multiple vehicle pile-up in the median of I-94 between exit 296 and 298 on 3/2/12. (Source: Valley City Times-Record)

March 16-18, 2012 Pickup rear ended and totaled by a semi in the eastbound lane of I94, mile marker 300. The pickup was going about 45 m.p.h. when the semi rear ended them. The semi received minor damage. One person was injured. (Source: Valley City Times-Record)

April 26, 2012 A roll-over accident with one injured person trapped inside the car. The vehicle had been northbound on 5th Ave and struck the back of a parked vehicle. A bystander extricated the driver from the still running vehicle saving the driver from worse injury. (Source: Valley City Times-Record)

August 7, 2012 A Digger, large vehicle, blew a front right tire, left I-94 one mile west of Tower City, crossed over a frontage road and smashed into a small grove of trees. There were no injuries. (Source: Valley City Times-Record)

August 8, 2012 No one was injured in a one-vehicle accident on I-94 at milepost 306. Semi driver had front right tire of the vehicle blow, causing loss of control of the vehicle, swerved right and left on the roadway and entered the south ditch. While the vehicle did not overturn, it vaulted a gravel frontage road and hit a plow parked near a grove of trees on private property. (Source: Valley City Times-Record)

February 6, 2013 Single vehicle accident. There was compacted ice on the road, driver lost control, over-corrected, entered the median and rolled. The driver and her two children received minor injuries. (Source: Valley City Times-Record)

February 20, 2013 The captain for ND Highway Patrol southeast region said on 2/18/13, a no travel advisory was issued in the Valley City and surrounding areas due to blowing snow causing near zero

visibility. The captain said "we probably had 15 crashes and 40 to 50 vehicles in the ditch, so then we had to respond to them in no visibility conditions." Cops say for your safety and the safety of others don't travel when no travel is advised. (Source: Valley City Times-Record)

March 26, 2013 (3/20/14) Two people have died as a result of injuries received in a one-car rollover accident on I94 west of Valley City on Wednesday. The accident occurred as they were driving through a portion of the roadway covered in ice by Hobart Lake, lost control of the vehicle, spun into the median and rolled. (Source: Valley City Times-Record)

March 26, 2013 One-vehicle crash has claimed the life of a Marion man. Driver lost control, entered the south ditch of rural 56th St, and came to rest on its passenger side facing south. The driver was ejected from the vehicle, treated for non-life-threatening injuries and charged with a DUI. (Source: Valley City Times-Record)

April 17, 2013 Montana man injured in a single car accident near Valley City. Cruise control was set at 65 and vehicle slid on ice and compacted snow, overcorrected and overturned in the median. (Source: Valley City Times-Record)

July 16, 2013 A MN motor coach bus went off an I94 exit ramp in Valley City and crashed into a field, injuring five of its 14 passengers. The driver attempted to slow the bus as he exited the interstate at exit number 292, but the foot brake had little or no effect. The driver attempted to steer onto a paved road, but the bus continued on to the east ditch, impacted the embankment and came to rest about 150 yards SW of the interchange in a field. The bus did not overturn. (Source: Valley City Times-Record)

August 19, 2013 Multiple vehicle crash, two seriously injured on East Main Street and 2nd Ave on 8/16/13. The crash involved seven cars and five drivers. Minor injuries were reported from occupants of the other cars. Witness reported the truck moving at a high rate of speed driving in the center of the street then veering into the left lane. The truck struck the Impala traveling eastbound on Main Street preparing to turn north onto 2nd Ave NW. The impact propelled both vehicles into several other vehicle, both occupied and unoccupied. Both women were extricated by the Valley City Fire and Rescue, transported to Mercy Hospital and later air-lifted to Sanford Hospital in Fargo. The crash is under investigation. (Source: Valley City Times-Record)

October 10, 2013 One person killed when a single car entered a ditch and rolled on Barnes County Road 38, about half a mile from Litchville. The driver was ejected from the vehicle. Responding agencies included the Barnes County Ambulance, ND Highway Patrol, Litchville First Responders and the Valley City Ambulance. (Source: Valley City Times-Record)

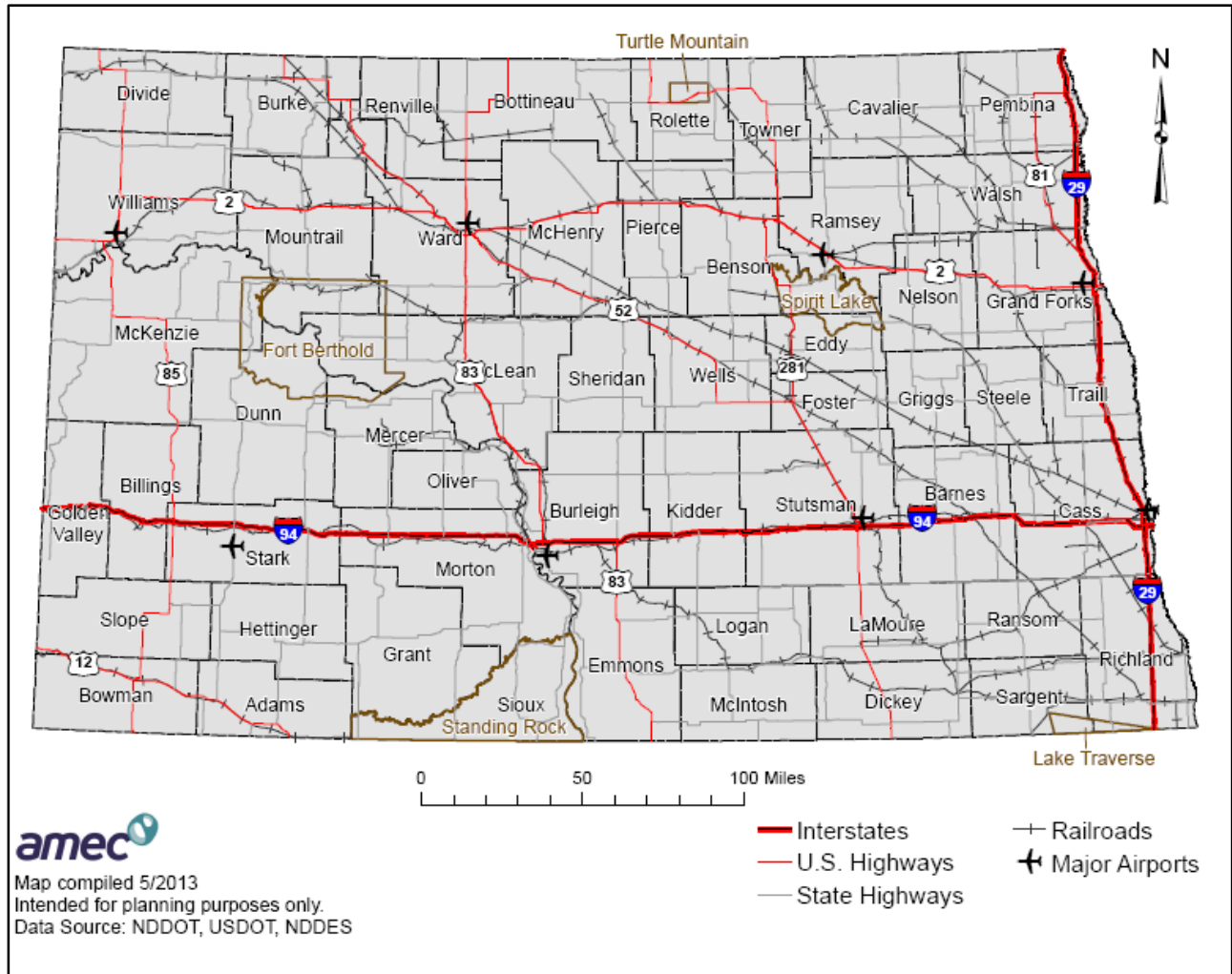
June 22, 2014 A 92-year old woman was struck by a car on Sunday evening in Valley City. She was airlifted to a Fargo hospital to be treated for her injuries. The crash happened just after 6 p.m., Sunday as the woman was cross the street. The driver of the vehicle was turning left from Central Avenue North onto Sixth Street Northwest. He did not see the woman in the street and hit her. Speed nor alcohol was a factor. (Source: Valley City Times-Record)

February 18, 2014 A man was injured in a single car rollover accident near Spiritwood. (Source: Valley City Times-Record)

July 24, 2014 A crash occurred between two semis on Interstate 94 about six miles from Valley City. The crash caused one semi to catch fire and left both drivers with minor injuries. The driver of one semi was driving too close to the other and was distracted by a passing vehicle, resulting in a rear-end collision. (Source: Valley City Times-Record)

Figure 5.11.2 illustrates the transportation network in North Dakota provided by the North Dakota Department of Emergency Services.

Figure 5.11.2 – North Dakota Transportation Network



Source: North Dakota Department of Emergency Services

5.12 Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

Characteristics

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light, and various reaction products.

Structure Fire Structure Fire is the result of three components: a heat source, a fuel source, and an oxygen source according to the U.S. Fire Administration. 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.

Winter weather can have a major effect on the number of fires that occur. Increasing costs of electricity, natural gas, propane, and fuel oil has led many people to look for alternative heating methods for their homes. Consequently, the use of space heaters, fireplaces, wood-burning stoves, and even continued use of coal stoves has created an increased fire hazard. Wood burning for heating has a poor safety record. Codes for the installation of stoves and chimneys may not be followed strictly, leading to increased fire risk. Many communities in North Dakota have not adopted building codes. Other energy sources include portable LP (propane) gas or kerosene heaters with self-contained fuel supplies. These are hazardous appliances, even when used according to manufacturer's instructions. Open flames and the leakage of fuel from containers are fire hazards and could cause explosions.

Although structure fires are usually individual disasters and not community-wide, the potential exists for widespread structure fires that displace several businesses or families and exceed local and even state resources. The “downtown” urban areas of North Dakota are particularly vulnerable to this hazard. A structure 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. North Dakota has the potential for large scale residential fires, commercial fires, and fires in public venues. In industrial areas pose the potential of chemical plant fires producing hazardous smoke and fumes.

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 growing.

Structure Collapse 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 explosions to extreme winds to heavy snow loads. Structure collapse can trap occupants and damage property. In Barnes County, numerous commercial and private elevators and large storage bins could be subject to structure collapse. Cattle operations have large cattle confinement structures that are also at risk of collapse. Urban fire/structure collapse can happen independently from other types of incidents.

History

History on urban fire/structure collapse incidents was provided by the Valley City Fire Department, Valley City Rural Fire Department, the National Fire Incident Reporting System (NFIRS), and the previously FEMA-approved Barnes County Mitigation Plan. Approximately 249 urban fire/structure collapse occurrences were recorded between January 1, 2010 and August, 2014 in the city of Valley City. On average, seven minor injuries occur each year. In rural areas surrounding Valley City 89 calls for service for the Valley City Rural Fire Department were reported. Table 5.12.1 summarizes urban fire/structure collapse data provided by the city and rural fire departments in Valley City. See the Hazard Profile and History section at the end of this chapter for an expanded version of the data along with information from the 2010 Barnes County MHMP.

Table 5.12.1 – January 1, 2010 to August 2014 Valley City Urban Fire/Structure Collapse Summary

| Urban Fire/Structure Collapse | | | | | |
|--------------------------------------|---------------------------------|-----------------|-------------------|------------------------|--------------------|
| Number of Calls | Date Range | Injuries | Fatalities | Property Damage | Crop Damage |
| 249 | January 1, 2010 to August, 2014 | NA | NA | NA | NA |
| Rural Fire Incidents | | | | | |
| Number of Calls | Date Range | Injuries | Fatalities | Property Damage | Crop Damage |
| 89 | January 1, 2010 to August, 2014 | NA | NA | NA | NA |

Sources: Valley City Fire Department, Valley City Rural Fire Department

Detailed information on history of fire calls and incidents from the fire districts/departments in Barnes County outside Valley City was not available. Data provided by the National Fire Incident Reporting System (NFIRS) summarizes by fire department and district the number of structure fires, vehicle fires and unclassified fires from January 1, 2002, through December 31, 2013. This information is used to help better understand the risk of urban fire/structure collapse in Barnes County outside Valley City. The N.D. State Fire Marshal's office started reporting with the NFIRS system in the end of 2001. It was not implemented until January of 2002. Fire departments and districts based in Barnes County reported a total of 147 structure fires, 104 vehicle fires and 188 "other" or unclassified fires. The Valley City Fire Department recorded the most structure fires with 93, followed by the Fingal Fire Protection District with 12. The Valley City Rural Fire Department recorded the most vehicle fires with 35, followed by the Valley City Fire Department with 33, and the Sanborn Fire Protection District with eight. The Valley City Rural Fire Department recorded the most "other" or unclassified fires with 113, followed by the Fingal Fire Protection District with 22, the Valley City Fire Department with 18, and the Wimbledon Fire Protection District with 14. NFIRS reports by fire department responding, not by location of the incident. Fire departments from neighboring counties have coverage over parts of Barnes County. Total number of fires reported may be more than what actually occurred in the county. As such, data from NFIRS was excluded from Table 5.12.1 to avoid skewing of data history and is shown for supportive purposes of the continued need for investment of funding into fire departments and districts in the county.

Table 5.12.2 – 2002 to 2013 Barnes County Fire Summary by Fire Department/District

| Fire Protection Agency | Frequency 2002-2013 | | | |
|------------------------------------|---------------------|---------------|-------------|------------|
| | Structure Fire | Vehicle Fires | Other Fires | Totals |
| Dazey Fire Protection District | 0 | 6 | 11 | 17 |
| Edna Rural Fire Department | 0 | 0 | 0 | 0 |
| Fingal Fire Protection District | 12 | 2 | 22 | 35 |
| Hastings Rural Fire Department | 1 | 0 | 0 | 1 |
| Kathryn Fire Protection District | 0 | 0 | 0 | 0 |
| Litchville Fire Department | 0 | 0 | 0 | 0 |
| Litchville Rural Fire Department | 1 | 2 | 1 | 2 |
| Nome Fire Protection District | 1 | 1 | 0 | 2 |
| Oriska Fire Department | 0 | 0 | 0 | 0 |
| Rogers Fire Department | 1 | 2 | 0 | 3 |
| Sanborn Fire Department | 1 | 1 | 2 | 4 |
| Sanborn Fire Protection District | 4 | 8 | 6 | 18 |
| Sibley Fire Department | 0 | 1 | 1 | 2 |
| Valley City Fire Department | 93 | 33 | 18 | 144 |
| Valley City Rural Fire Department | 29 | 45 | 113 | 187 |
| Wimbledon Fire Protection District | 4 | 3 | 14 | 21 |
| Totals | 147 | 104 | 188 | 436 |

Source: National Fire Incident Reporting System Summary By Incident Type. 01/01/2002 to 12/31/2013

There have been no declared disasters or emergencies pertaining to urban fire/structure collapse in Barnes County.

Probability and Magnitude

Data provided by the Valley City Fire Department and Valley City Rural Fire Department documents 289 calls for urban fire/structure collapses and 89 calls for rural fires occurring between January 1, 2010 and August, 2014. According to data provided by NFIRS, a total of 147 structure fires, 104 vehicle fires and 188 other fires occurred between 2002 and 2013, resulting in a probability of 100 percent.

In terms of magnitude, smaller and less severe fires are typical. The Valley City Fire and Rural Fire Departments did not report any fatalities, but did state that on average approximately seven minor injuries occur each year. The probability of fires fluctuates by season, local weather patterns, and traffic conditions among other variables. The chances of structure fire increases during winter months as people use electric heaters and other alternative sources for heating homes. Fires from vehicles and transportation accidents can occur at any point in time during the year.

According to the 2014 NDMHMP, Barnes County had a moderate urban fire or structure collapse vulnerability rating based on housing density per square mile, which was 3.82. The only cities that have adopted the building codes are Fingal, Kathryn, Leak, Nome, Oriska, Sanborn and Valley City.

Risk Assessment

Table 5.12.3 shows the risk assessment as determined by individual jurisdictions and the planning committee. The risk assessment methodology can be found in Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 5.12.3 – Risk Assessment Summary Urban Fire/Structure Collapse Scored Chart

| Urban Fire/Structure Collapse | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|-------------------------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 2 | 3 | 3 | 3 | 2 | 11 |
| Dazey | 3 | 2 | 2 | 3 | 2 | 8 |
| Fingal | 3 | 3 | 3 | 4 | 1 | 12 |
| Kathryn | 2 | 2 | 3 | 3 | 2 | 8 |
| Leal | 2 | 2 | 2 | 3 | 1 | 8 |
| Litchville | 1 | 1 | 2 | 3 | 2 | 5 |
| Nome | 3 | 2 | 3 | 3 | 2 | 9 |
| Oriska | 2 | 3 | 3 | 3 | 1 | 10 |
| Pillsbury | 2 | 2 | 2 | 2 | 1 | 7 |
| Rogers | 3 | 2 | 2 | 3 | 1 | 9 |
| Sanborn | 2 | 2 | 3 | 4 | 3 | 8 |
| Sibley | 3 | 2 | 4 | 3 | 1 | 11 |
| Valley City | 4 | 3 | 3 | 3 | 2 | 11 |
| Wimbledon | 4 | 2 | 3 | 3 | 3 | 9 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|-------------------|
| Seasonal Pattern | Spring to Fall |
| Duration | April to November |
| Speed of Onset | No warning |

Capabilities of and Vulnerabilities to Jurisdictions

Capabilities and vulnerabilities were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of property, vehicles, personal possessions • Loss of economy • Loss of critical facilities and infrastructure • Loss of equipment and structures • Potential loss of life |
| Frequency | 3 | <ul style="list-style-type: none"> • Approximately 680 reports between 2004 and 2009 resulting in 97 annual incidents |
| Likelihood | 3 | <ul style="list-style-type: none"> • Vegetation can become dry from drought and cause a building fire • Always a possibility • Higher probability due to increase of electronic devices and alternative heat sources • Approximately 100 percent probability based on previous occurrences • Numerous older residences in jurisdictions • Human error in manufacturing and engineering of materials used in building and construction |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Diversion of fire suppression resources for other hazards • More vulnerable: Lack of building codes in small jurisdictions • Less vulnerable: Collapsed structure team based in Fargo can respond to events in the county • Lack of water tower or holding tank in some of the smaller communities • Distance from neighboring fire departments can lead to more issues, bigger impact, etc. • Less vulnerable: Educated fire departments |
| Capability | 2 | <ul style="list-style-type: none"> • Active county commission • Fire department and districts with equipment and personnel • Relies on county, regional, state and other agencies for assistance as fire department only has one full-time staff member • Fire departments conduct education and outreach to school and the general public • Some jurisdictions have adopted state building codes, but lack enforcement except for Valley City • Natural Guard is located in the county |

Vulnerabilities to County-Owned Buildings and Property

Any and all county-owned buildings are vulnerable to urban fire/structure collapse. The risk to the hazard depends on the location of the building and if it is equipped with fire suppression mechanisms, such as sprinkler systems and smoke detectors. Risk to building and property depends on the proximity of fire suppression equipment and response times from fire departments. Older county-owned buildings may be more susceptible to fire being built to older building and electrical codes. County-owned buildings with flat roofs are more at risk to building collapse from snow loads. Chapter 4 provides a summary of city- and county-owned buildings and property in Barnes County.

Vulnerabilities of Critical Facilities and Infrastructure

Similar to county-owned buildings and property, critical facilities and infrastructure are vulnerable to urban fire/structure collapse. If an incident were to occur, the facility or infrastructure could result in loss of or delay in services. A fire affecting critical infrastructure such as power lines or lift stations could leave residents without power, potable water or sanitary sewer for days, depending on the severity of the incident.

Vulnerabilities to New and Future Development

New and future development could be more vulnerable in communities that lack building codes. Buildings in jurisdictions that lack building codes could be more susceptible to snow loads, structural instability and may lack fire suppression systems. In addition, new development located near or adjacent to industrial facilities housing hazardous chemicals could be more at risk. Barnes County has adopted the state building code which covers new and future development in the county. Adoption and enforcement of building codes should reduce the risk and vulnerability to new and future development.

Data Limitations and Other Key Documents

A data limitation is a lack of specific details on property damage, location, and other descriptions. The NFIRS data does not distinguish between an urban fire and structure collapse. As a result, there is difficulty in determining the true probability and overall impact of structure collapse. Fire department and district boundaries cross county lines. Smaller and rural fire departments/districts do not tabulate history.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

- Barnes County Emergency Operations Plan
- North Dakota Emergency Operations Plan, Fire Annex

Hazard Profile and History

Detailed incidents of urban structure fire and structure collapse between January 1, 2010 and August, 2014 for the city of Valley City is shown in Table 5.12.4. The Valley City Rural Fire Department also tracks incidents of rural fires, which is shown in Table 5.12.5. Incidents of urban fire/structure collapse from the 2010 Barnes County MHMP is shown after Table 5.12.5.

Table 5.12.4 shows history of urban fire/structure collapse incidents in Valley City from the Valley City Fire Department. Specific information on injuries, fatalities, property damage, and crop damage is not available. The fire chief said that on average, seven minor injuries per year occur. The Valley City Fire Department responded to 249 calls between January 1, 2010 and August, 2014.

Table 5.12.4 – January 1, 2010 to August 2014 Valley City Fire Department Incidents of Fire

| Year | Number of Fires | Injuries | Fatalities | Property Damage | Crop Damage | Remarks | Source |
|--------------|-----------------|----------|------------|-----------------|-------------|--|-----------------------------|
| 2010 | 42 | NA | NA | NA | NA | Mixture of alarm calls, vehicles, hot smells, carbon monoxide, gas line breaks. | Valley City Fire Department |
| 2011 | 52 | NA | NA | NA | NA | Mixture of alarm calls, vehicles, hot smells, carbon monoxide calls, gas line breaks. | Valley City Fire Department |
| 2012 | 56 | NA | NA | NA | NA | Mixture of alarm calls, vehicles, hot smells, carbon monoxide calls, smoke calls, gas line breaks. | Valley City Fire Department |
| 2013 | 51 | NA | NA | NA | NA | Mixture of alarm calls, vehicles, hot smells, carbon monoxide calls, lost child, gas line breaks. | Valley City Fire Department |
| 2014 | 48 | NA | NA | NA | NA | Mixture of alarm calls, vehicles, hot smells, carbon monoxide calls, smoke calls, gas line breaks. | Valley City Fire Department |
| Total | 249 | | | | | | |

Source: Valley City Fire Department

Table 5.12.5 shows history of urban fire/structure collapse and rural fire incidents in areas surrounding Valley City from the Valley City Rural Fire Department. Information on injuries, fatalities, property damage, and crop damage is not available. The Valley City Rural Fire Department responded to 89 calls between January 1, 2010 and August, 2014.

Table 5.12.5 – January 1, 2010 to August 2014 Valley City Rural Fire Department Incidents of Fire

| Year | Number of Fires | Injuries | Fatalities | Property Damage | Crop Damage | Remarks | Source |
|--------------|-----------------|----------|------------|-----------------|-------------|---|-----------------------------------|
| 2010 | 15 | NA | NA | NA | NA | Three vehicles fires, two HAZMAT, five structure fires. | Valley City Rural Fire Department |
| 2011 | 18 | NA | NA | NA | NA | Three vehicle fires, two HAZMAT calls, one combine, five structure fires. | Valley City Rural Fire Department |
| 2012 | 23 | NA | NA | NA | NA | Four vehicle fires, five structure fires. | Valley City Rural Fire Department |
| 2013 | 19 | NA | NA | NA | NA | One tractor fire, four structure fires, two HAZMAT. | Valley City Rural Fire Department |
| 2014 | 14 | NA | NA | NA | NA | Two vehicle fires, two HAZMAT calls, three structure fires. | Valley City Rural Fire Department |
| Total | 89 | | | | | | |

Source: Valley City Fire Rural Department

Information from the 2010 Barnes County MHMP is shown below and details a history of incidents between January 1, 2003 and December 31, 2009. A total of 680 calls were received.

- 327 Fires
- 4 Overpressure ruptures, explosions, overhear
- 58 Rescue calls
- 105 Hazardous condition
- 38 Service calls
- 49 Good intent calls
- 4 Severe weather or natural disasters
- 5 Special incident
- 90 False calls
- 112 Natural vegetation fires (This does not include any other outside fires, such as outside rubbish fires or cultivated vegetation (crop) fires.)

1997 The Winter Show Building collapsed. Had this occurred during the Winter Show, mass fatalities would have been the result.

5.13 Wildland Fire

Including Wildland Fire and Rural Fire.

Characteristics

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light, and various reaction products.

Wildland Fire. A wildland fire is an uncontrolled fire in a vegetated area. Wildland 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, 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 wildland fire occur when combined with the human environment. People and structures near wildland fire can be threatened unless adequately protected through evacuation, mitigation, or suppression.

The general wildland fire season runs from April 1st through October 31st. There are three critical periods during wildland fire season: early spring prior to green-up, late summer due to higher temperatures, 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. In general statewide, the month of April accounts for about 20 percent of the wildland fire 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 percent of the annual burned acreage. This third fire season typically extends until a season-ending snowfall. Fire along railroad right-of-ways is a common occurrence during extremely dry conditions.

The charred ground and thick smoke plumes that can be produced by wildland fire creates 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 wildland fire, 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 fire occurs in the spring at the same time that flood risk is high in North Dakota.

Humans and human activity cause most of the wildland fires in North Dakota based on historical data. Loss of fire containment while attempting controlled burns of fields, ditches, and sloughs is a source of fires in Barnes County. Other sources of fire are related to 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.

Rural Fire. Rural fires result from farming activities whereby farm equipment may ignite a fire while haying, harvesting and other farming activities.

History

History of wildland fire and rural fire was provided by the N.D. Forest Service. Approximately 36 wildland fire occurrences were recorded 2005 and 2008. The largest wildland fire reported was reported one mile west of Urbana in Barnes County near the Stutsman County Line - sections 18, 19, and 20. Proposed industrial development in Spiritwood Township in neighboring Stutsman County may increase risk to the hazard over the next five years. The average size of all other incidents when the largest fire is excluded is approximately 13 acres.

The 2014 NDMHMP states the wildland fire risk to jurisdictions in Barnes County is low and also shows a map of the location of wildland fires burning 1,000 acres or more. One fire over 1,000 acres was reported one mile west of Urbana in Barnes County near the Stutsman County Line - sections 18, 19, and 20.

Table 5.13.1 summarizes wildland fire in Barnes County. See Hazard Profile and History section at the end of this chapter for details of wildland fire occurrences.

Table 5.13.1 – 2005 to 2008 Barnes County Wildland Fire Summary

| Wildland Fire | | | | | |
|-----------------------|--------------|--------------|---------------------------|-----------------|-------------|
| Number of Occurrences | Date Range | Largest Fire | Average Fire Size (Acres) | Property Damage | Crop Damage |
| 36 | 2005 to 2008 | 1,000 | 13 | 0 | 0 |

Source: N.D. Forest Service

There have been no declared disasters or emergencies pertaining to wildland fire in Barnes County.

Data provided by the National Fire Incident Reporting System (NFIRS) summarizes by fire department and district the number of structure fires, vehicle fires and unclassified fires from January 1, 2002, to December 31, 2013. Table 5.13.2 shows fires in Barnes County. Other fires can include wildland fire, but the exact number is unknown. Approximately 188 other fires occurred from fire districts and departments providing coverage in Barnes County.

Table 5.13.2 – 2002 to 2013 Barnes County Fire Summary by Fire Department/District

| Fire Protection Agency | Frequency 2002-2013 | | | |
|------------------------------------|---------------------|---------------|-------------|------------|
| | Structure Fire | Vehicle Fires | Other Fires | Totals |
| Dazey Fire Protection District | 0 | 6 | 11 | 17 |
| Edna Rural Fire Department | 0 | 0 | 0 | 0 |
| Fingal Fire Protection District | 12 | 2 | 22 | 35 |
| Hastings Rural Fire Department | 1 | 0 | 0 | 1 |
| Kathryn Fire Protection District | 0 | 0 | 0 | 0 |
| Litchville Fire Department | 0 | 0 | 0 | 0 |
| Litchville Rural Fire Department | 1 | 2 | 1 | 2 |
| Nome Fire Protection District | 1 | 1 | 0 | 2 |
| Oriska Fire Department | 0 | 0 | 0 | 0 |
| Rogers Fire Department | 1 | 2 | 0 | 3 |
| Sanborn Fire Department | 1 | 1 | 2 | 4 |
| Sanborn Fire Protection District | 4 | 8 | 6 | 18 |
| Sibley Fire Department | 0 | 1 | 1 | 2 |
| Valley City Fire Department | 93 | 33 | 18 | 144 |
| Valley City Rural Fire Department | 29 | 45 | 113 | 187 |
| Wimbledon Fire Protection District | 4 | 3 | 14 | 21 |
| Totals | 147 | 104 | 188 | 436 |

Source: National Fire Incident Reporting System Summary By Incident Type. 01/01/2002 to 12/31/2013

Probability and Magnitude

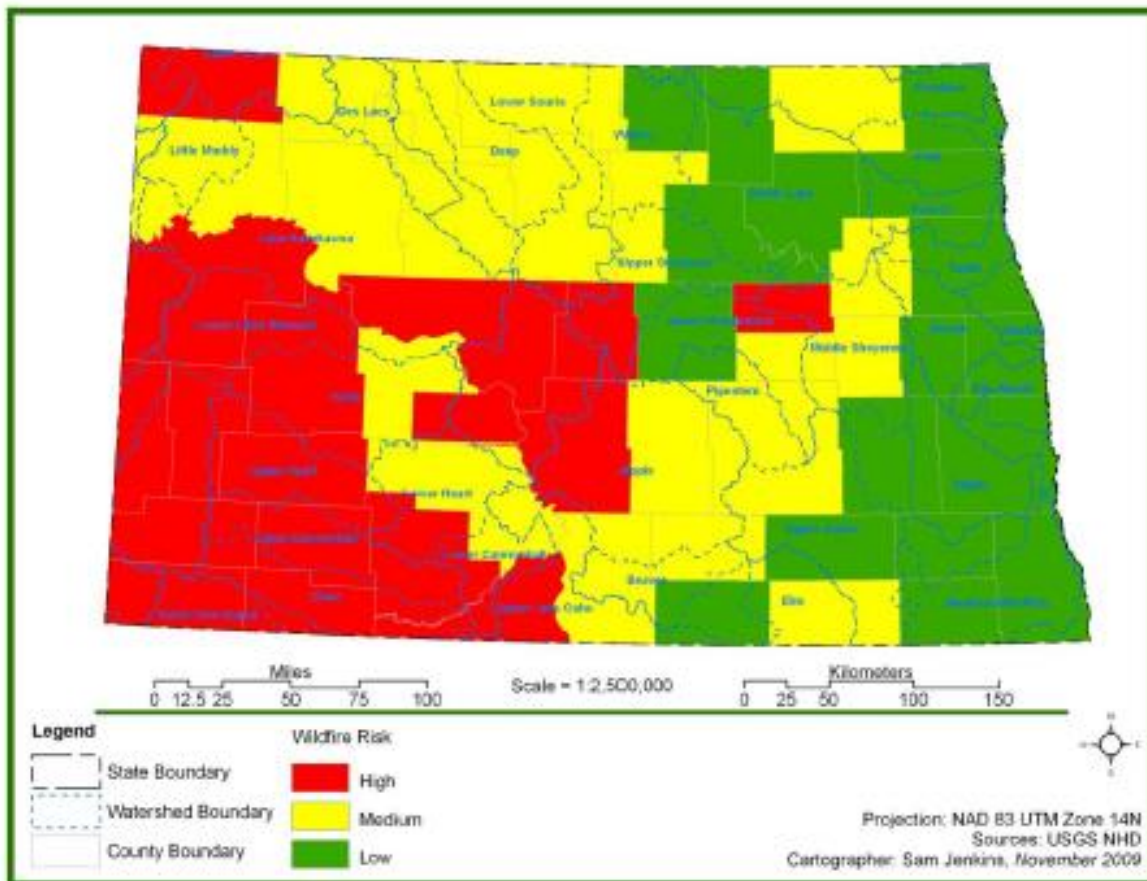
According to the N.D. Forest Service, approximately 36 occurrences of wildland fire occurred in Barnes County between 2005 and 2008. Figure 5.13.2 shows that 14 wildland fires occurred in Barnes County between 1988 and 1996. Figure 5.13.3 shows the total amount of acres burned by wildfire and the number of wildfires occurring in North Dakota by county between 1988 and 2006. The largest wildfire in Barnes County occurred in 2008 and burned 1,000 acres. The fire is excluded from the figure. Data provided by the Valley City Fire Department and Valley City Rural Fire Department documents 289 calls for urban fire/structure collapses and 89 calls for rural fires occurring between January 1, 2010 and August 2014. According to data provided by NFIRS, a total of 147 structure fires, 104 vehicle fires and 188 other fires occurred between 2002 and 2013. Other fires can include wildland fire, but the exact number is unknown. Based on statistics from both sources, the resulting probability of wildland fire is 100 percent.

In terms of magnitude, smaller and less severe fires are typically occur more frequently with larger and more severe fires happening sparingly. The probability of wildland fires fluctuates based on season, local weather patterns, traffic conditions, among other variables. The chance of wildland fires increases during summer months when the agriculture sector is in full force and natural vegetation can become dry due to extreme heat. The magnitude of wildland fires can be assumed to be small as reported wildland fires remain less than 1,000 acres in the county, with the exception of one fire in 2008 that the Sanborn Fire

Department responded to. Proposed industrial development in Spiritwood Township in neighboring Stutsman County near the site of the 2008 fire burning more than 1,000 acres may increase risk to the hazard over the next five years.

Mapping. The risk of wildland fire in Barnes County is ranked low per the 2014 NDMHMP (Figure 5.13.1).

Figure 5.13.1 – Wildfire Risk by North Dakota County



Source: North Dakota Department of Emergency Services

Risk Assessment

Table 5.13.3 shows the risk assessment as determined by individual jurisdictions and the planning committee. The risk assessment methodology can be found in Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction’s impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction’s capabilities to respond to the hazard.

Table 5.13.3 – Risk Assessment Summary Wildland Fire Scored Chart

| Wildland Fire | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|---------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 2 | 3 | 3 | 3 | 1 | 10 |
| Dazey | 4 | 3 | 3 | 4 | 2 | 12 |
| Fingal | 3 | 3 | 3 | 3 | 1 | 11 |
| Kathryn | 2 | 2 | 2 | 3 | 2 | 7 |
| Leal | 4 | 2 | 2 | 3 | 1 | 10 |
| Litchville | 2 | 2 | 2 | 2 | 3 | 5 |
| Nome | 3 | 2 | 2 | 2 | 2 | 7 |
| Oriska | 4 | 2 | 2 | 2 | 2 | 8 |
| Pillsbury | 2 | 2 | 2 | 4 | 2 | 8 |
| Rogers | 3 | 3 | 4 | 2 | 2 | 10 |
| Sanborn | 3 | 2 | 3 | 3 | 3 | 8 |
| Sibley | 4 | 2 | 3 | 4 | 1 | 12 |
| Valley City | 4 | 4 | 4 | 3 | 2 | 13 |
| Wimbledon | 4 | 3 | 2 | 2 | 3 | 8 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|-------------------|
| Seasonal Pattern | Spring to Fall |
| Duration | April to November |
| Speed of Onset | No warning |

Capabilities of and Vulnerabilities to Jurisdictions

Capabilities and vulnerabilities were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|---------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of economy, crops and livestock • Damage to farm equipment and structures resulting in fiscal losses • Strain on local fire departments and resources • Loss of life, injury, loss of economy • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality |
|---------------|---|--|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Loss of wildlife habitat |
| Frequency | 3 | <ul style="list-style-type: none"> • Always a possibility as controlled burns set by farmers can become unmanageable • Approximately 36 cases of wildland fire between 2003 and 2009. |
| Likelihood | 3 | <ul style="list-style-type: none"> • Always a possibility as controlled burns set by farmers can become unmanageable • Approximately 100 percent probability based on previous occurrences • Dry conditions each year for a couple weeks, strong winds • Controlled burns to help control the vegetation occur each year and will continue |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of fire breaks around cities • More vulnerable: Lack of backup water supplies throughout the county • More vulnerable: Lack of manpower and volunteers in rural fire departments • More vulnerable: Lack of equipment in smaller communities • More vulnerable: Prolonged response from surrounding fire districts • Lack of fire breaks around urban areas |
| Capability | 1 | <ul style="list-style-type: none"> • Active county commission • Fire department and districts with equipment and personnel • Relies on county, regional, state and other agencies for assistance as fire department only has one full-time staff member • Fire departments conduct education and outreach to school and the general public • Some jurisdictions have adopted state building codes, but lack enforcement except for Valley City • Natural Guard is located in the county |

Vulnerabilities to County-Owned Buildings and Property

County-owned buildings and property located in remote areas of the county are vulnerable to wildland fire. The risk of the hazard depends on building and property location and if emergency services are able to reach the property in a timely manner. An inventory of county-owned buildings and property is shown in Chapter 4.

Lack of firebreaks around jurisdictions in Barnes County pose a vulnerability to county-owned buildings and property. If a wildland fire were to grow and become uncontrollable, buildings and property would be at risk from the spread of the fire.

Vulnerabilities of Critical Facilities and Infrastructure

Similar to county-owned buildings and property, critical facilities and infrastructure are vulnerable to wildland fire. If an incident were to occur, the facility or infrastructure could result in loss of or delay in services. An inventory of county and city owned property in Barnes County is provided in Chapter 4.

Vulnerabilities to New and Future Development

Rural homesteads on large parcels of land in remote areas are a trend in residential development in North Dakota. Barnes County has planning regulations limiting providing regulation where new residential development can occur. All types of development could be more vulnerable to wildland fire and located farther from fire departments and emergency services. Residential development in remote areas increase the opportunity for human caused fires.

Data Limitations and Other Key Documents

Limited data was available from fire departments and districts in the county. Valley City Fire Department and Valley City Rural Fire Department was the only entity tabulating fire data history. However, many smaller jurisdictions did not have any incidents to report. From the data that was available, a data limitation is the lack of the location and details of wildland fires. Fire department and district boundaries cross county lines, therefore, coverage in some areas of the county is provided by departments and districts based in neighboring counties. Similarly, Barnes County departments also provide coverage to neighboring counties.

This plan incorporates data from the following documents and information from this plan will be incorporated in the update of the following documents.

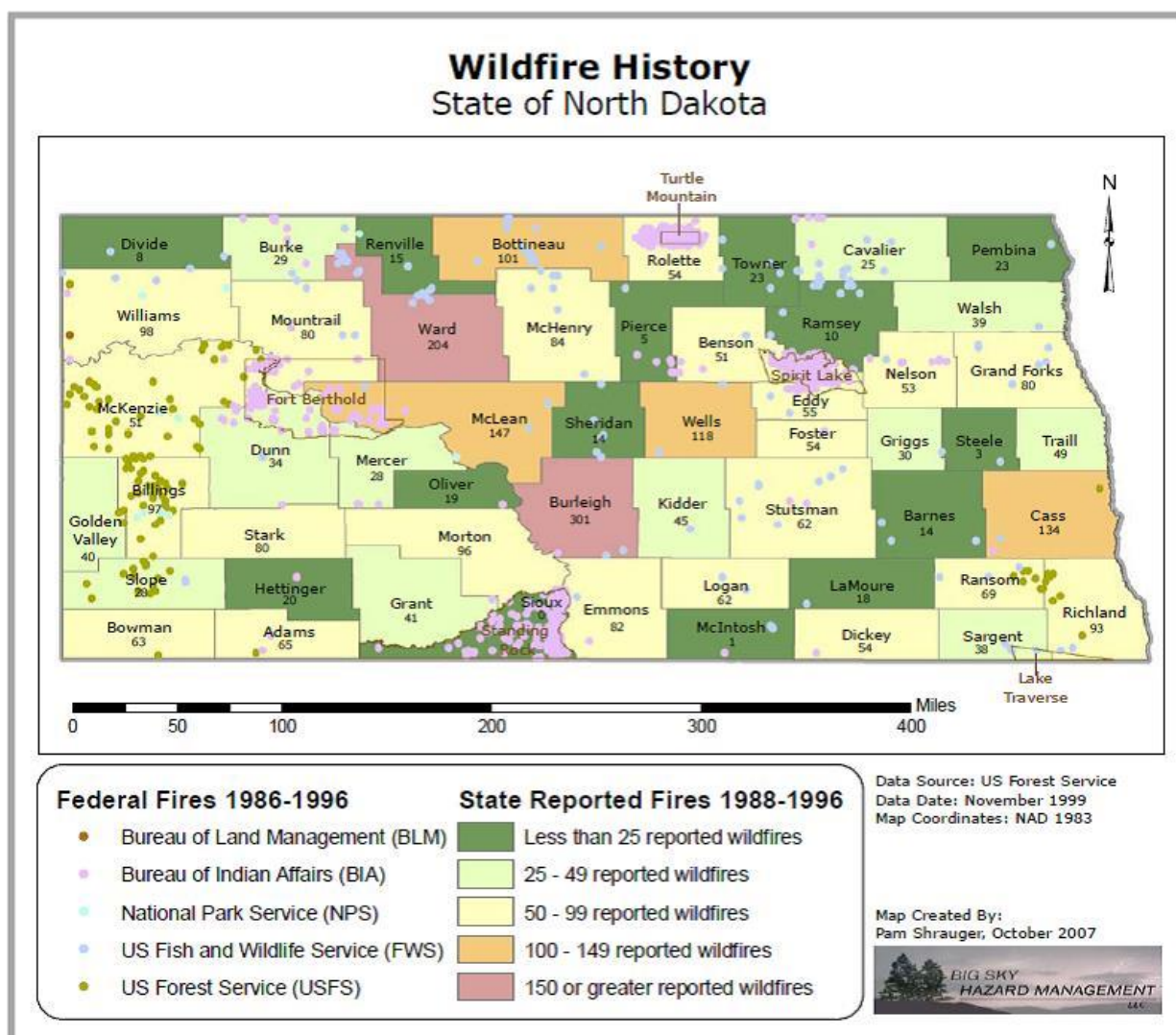
- Barnes County Emergency Operations Plan
- North Dakota Emergency Operations Plan, Fire Annex
- North Dakota Forest Service, Building Sustainable Communities Through Forestry
- North Dakota Statewide Assessment of Forest Resources and Forest Resource Strategy
- Fire Management Plans for federal lands

Hazard Profile and History

The history of wildland incidents was provided by the N.D. Forest Service and is shown in Table 5.13.1. Figure 5.13.2 shows the number of wildfires occurring in North Dakota by county between 1988 and 1996. Figure 5.13.3 shows the total amount of acres burned by wildfire and the number of wildfires occurring in North Dakota by county between 1988 and 2006. Wildland fire data was not available after 2008 from the N.D. Forest Service due to database system errors. Detailed incidents of wildland fires were not tracked by local fire districts and departments.

Figure 5.13.2 shows the number of wildfires occurring in North Dakota by county between 1988 and 1996. A total of 14 fires were reported in Barnes County.

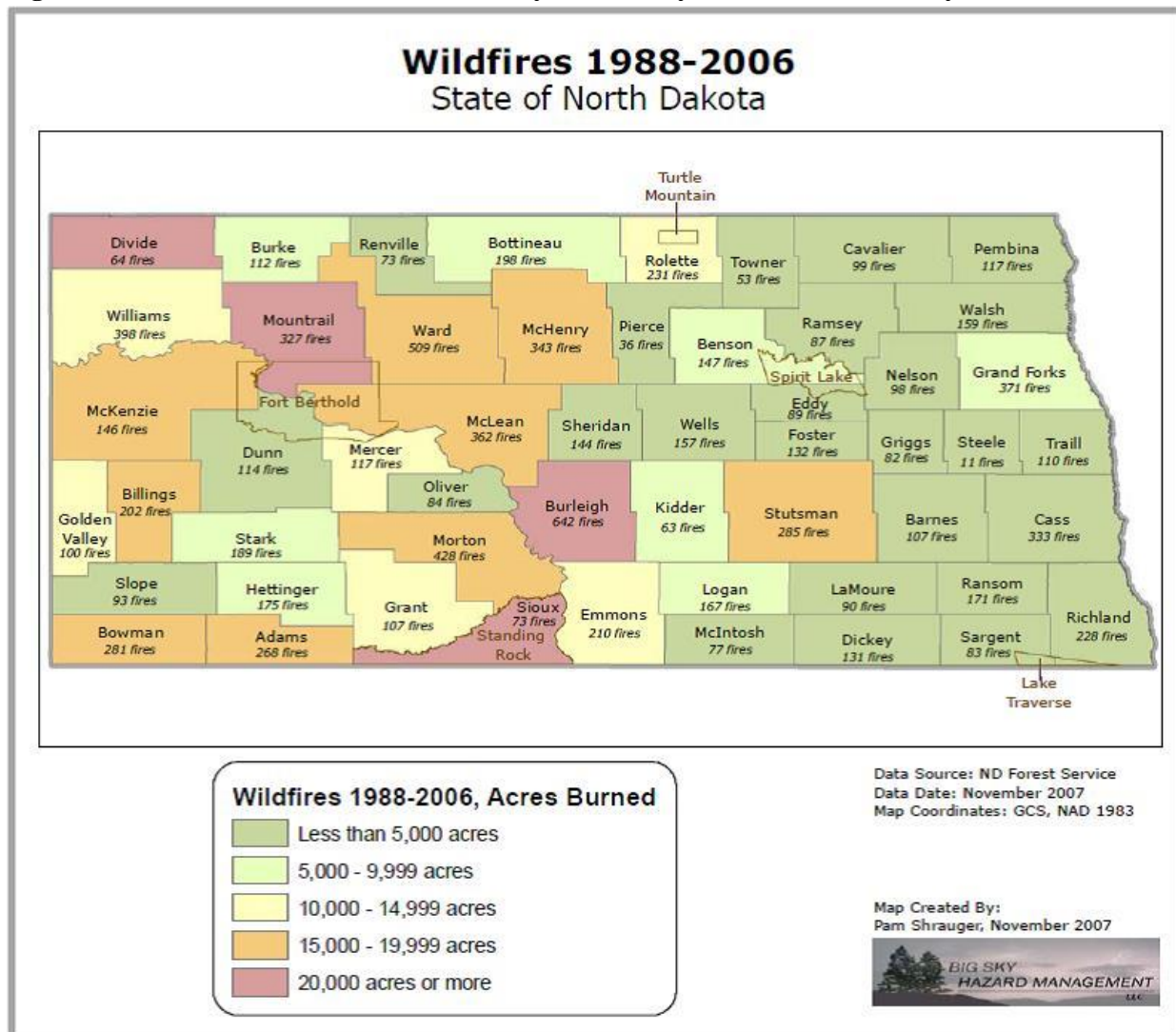
Figure 5.13.2 – 1988 to 1996 North Dakota Wildfire History



Sources: Bismarck National Weather Service, 2010 Barnes County MHMP

Figure 5.13.3 shows the total amount of acres burned by wildfire and the number of wildfires occurring in North Dakota by county between 1988 and 2006. The largest wildfire in Barnes County occurred in 2008 and burned 1,000 acres. The fire is not shown in the figure.

Figure 5.13.3 – 1988 to 2006 Acres Burned by Wildfire by North Dakota County

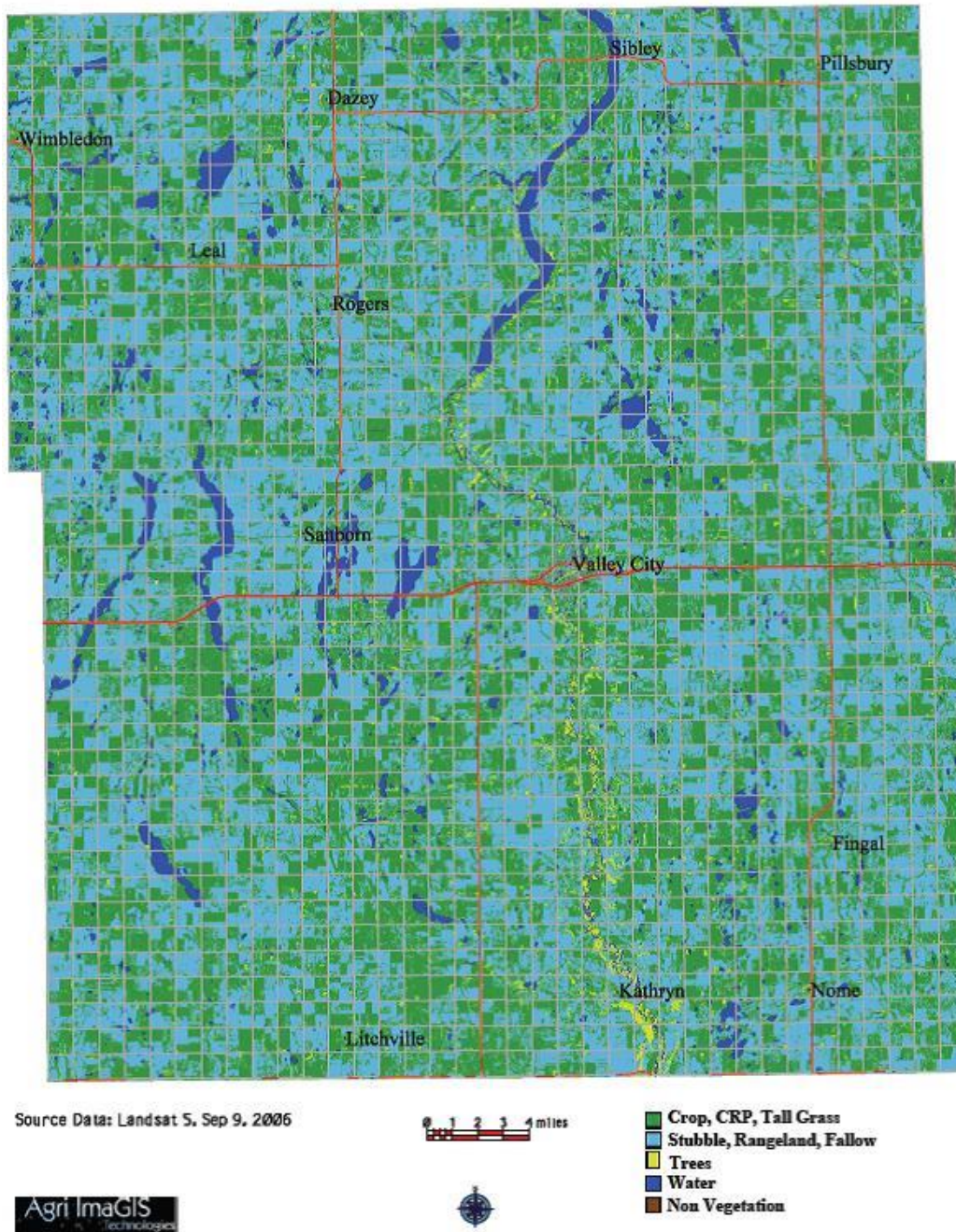


Sources: N.D. Department of Emergency Services, Barnes County MHMP

Figure 5.13.4 shows the Barnes County Fire Model. The fire model was development for the Barnes County Community Wildfire Protection Program Plan to show vegetative layers for wildfires.

Figure 5.13.4 – Barnes County Fire Model

Barnes County, ND Fire Model



Source: 2010 Barnes County MHMP

5.14 Windstorm

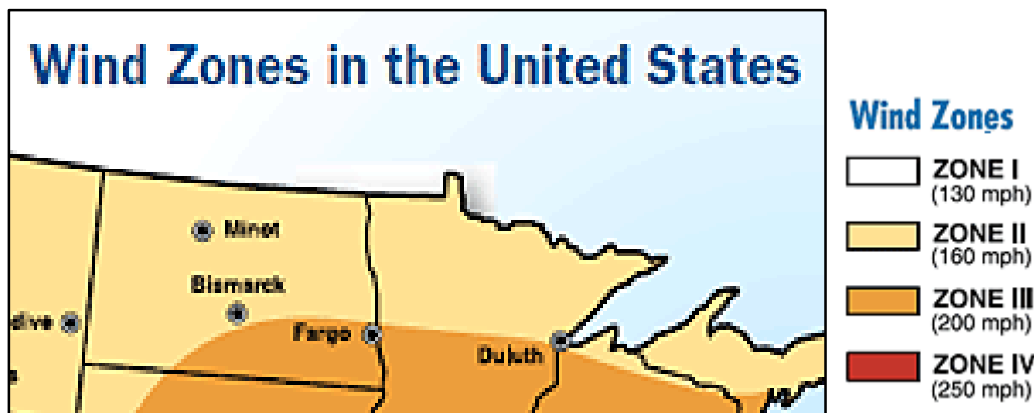
Including high wind events that occur separately from tornados and severe thunderstorms.

Characteristics

Strong winds can occur year-round in Barnes County. 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. Objects like trees, barns, outbuildings, high-profile vehicles, and power lines/poles can be toppled or destroyed in high winds. Roofs, windows, and homes can be damaged as wind speeds increase. Strong winds can be particularly dangerous to aviation.

In the U.S., FEMA recognizes four wind zones. A comparison of Figures 5.14.1 and 5.14.2 shows that Barnes County falls into Zones II and III. Winds speeds reach up to 200 miles per hour in Zone III. No special wind regions are identified in Barnes County.

Figure 5.14.1 Wind Zones in the Unites States



Source: FEMA

Figure 5.14.2 Map of Barnes County in North Dakota



History

According to NOAA, NCDC and SHELDUS, and the 2010 Barnes County MHMP, Barnes County has 95 reported high wind events between 1957 and January 2013 resulting in no injuries, 0.06 deaths, \$2,269,518 in property damage, and \$12,759,887 in crop damage. Table 5.14.1 summarizes the history of windstorm occurrences in Barnes County. A detailed record of data history for windstorms can be found in the Hazard Profile and History section of this chapter, in addition to a map showing high wind events in North Dakota by county between 2000 and 2013.

According to the 2014 NDMHMP, between 2000 and 2013 Barnes County experienced \$300,000 in property damages or \$21,429 annually, and \$281,082 in total insurance payments to cover crop losses or \$20,077 annually due to windstorms. Crop loss data from the RMA is similar to what is reported in the state plan. However, the amount of property and crop damage shown in Table 5.14.1 is far greater than what is shown in the state plan and from data provided by the RMA.

Table 5.14.1 – 1957 to January 2013 Barnes County Windstorm Summary

| Windstorm | | | | | | |
|-----------------------|------------------------|-------------|----------|------------|-----------------|--------------|
| Number of Occurrences | Date Range | Probability | Injuries | Fatalities | Property Damage | Crop Damage |
| 95 | 1957- January, 2013 | 100% | 0 | 0.06 | \$2,269,518 | \$12,759,887 |

Sources: Spatial Hazard Events and Losses Database for the United States (SHELDUS)
National Oceanic and Atmospheric Administration (NOAA)
Information Service/National Climatic Data Center (NCDC)
2009 Barnes County Mitigation Plan

There have been no declared disasters or emergencies pertaining to windstorm in Barnes County.

Crop loss from windstorm is tracked by the United States Department of Agriculture Risk Management Agency (RMA). The RMA provides data on the crop type affected, net claimed acres, indemnity, loss liability, loss cost and the number of policies covered. The net claimed acres is the total acres planted for crops in the county for the given year. Liability is the total value in crops planted in the county for the given year and indemnity is the amount paid to cover insurance claims from crop loss due to windstorm. The loss liability of crops from windstorm was \$527,922 in Barnes County between 1990 and 2013 on 5,569 acres. Indemnity paid was \$259,681 resulting in losses of 49 percent of total liability. Crop loss indemnity paid over the 24-year period resulted in an annual average of \$10,820. Detailed data is available per crop for each year and can be found in Table 5.14.3.

Probability and Magnitude

Hazard history was gathered from NOAA, NCDC, SHELDUS, and the previously FEMA-approved Barnes County Mitigation plan. The data covers a 57-year period from 1957 through January, 2013, and documents 95 notable windstorm occurrences, which equates to a probability of 100 percent. Data from the 2014 NDMHMP shows 15 windstorm events between 2000 and 2013 resulting in a probability of 100 percent. Indemnity was paid for crop loss from windstorm on 11 occurrences between 1990 and 2013 resulting in a probability of 46 percent. Crop loss data from the RMA reveals that indemnity will be paid roughly once every two years. The magnitude of the hazard can range from broken windows, damaged

roofs to homes and businesses, toppled trees, power outages from downed power lines and collapse of poorly constructed structures.

Risk Assessment

Table 5.14.2 shows the risk assessment as determined by individual jurisdictions and the planning committee. The risk assessment methodology can be found in Chapter 5, Threat and Hazard Identification and Risk Assessment. The total in this chart represents the sum of each jurisdiction's impact, frequency, likelihood and vulnerability to a hazard less the jurisdiction's capabilities to respond to the hazard.

Table 5.14.2 – Risk Assessment Summary Windstorm Scored Chart

| Windstorm | Impact | Frequency | Likelihood | Vulnerability | Capabilities | Total |
|---------------|--------|-----------|------------|---------------|--------------|-----------|
| Barnes County | 4 | 3 | 3 | 2 | 1 | 11 |
| Dazey | 3 | 3 | 3 | 2 | 2 | 9 |
| Fingal | 4 | 3 | 3 | 4 | 1 | 13 |
| Kathryn | 3 | 3 | 3 | 2 | 2 | 9 |
| Leal | 4 | 3 | 3 | 3 | 2 | 11 |
| Litchville | 2 | 2 | 2 | 2 | 3 | 5 |
| Nome | 4 | 3 | 3 | 3 | 1 | 12 |
| Oriska | 3 | 2 | 2 | 3 | 4 | 6 |
| Pillsbury | 2 | 3 | 3 | 3 | 1 | 13 |
| Rogers | 4 | 2 | 3 | 3 | 2 | 10 |
| Sanborn | 4 | 3 | 3 | 3 | 2 | 11 |
| Sibley | 4 | 4 | 2 | 4 | 1 | 13 |
| Valley City | 3 | 4 | 4 | 2 | 3 | 10 |
| Wimbledon | 4 | 4 | 4 | 3 | 1 | 14 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

| | |
|-------------------------|------------------------|
| Seasonal Pattern | None |
| Duration | 2 to 6 hours |
| Speed of Onset | 12 to 16 hours warning |

Capabilities of and Vulnerabilities to Jurisdictions

According to the 2014 NDMHMP, Barnes County has an overall vulnerability ranking of low-moderate to windstorms.

Capabilities and vulnerabilities were scored at jurisdictional meetings with participants including the mayor and city auditor, in addition to members from the city council, business owners, emergency services representatives, and members of the general public. Participants discussed the incidents that occur in their jurisdiction and how frequent impacts are from the hazard. Afterwards, they scored impacts and frequency of the hazard. Participants compared the impacts and frequency of the hazard and determined future prevalence. The likelihood of the hazard was then scored. Vulnerability was scored with participants stating what makes the jurisdiction less vulnerable given their resources at hand or more

vulnerable by identifying resources not available. Capabilities were scored by the plan consultants based on the capability assessment worksheet found in the 2013 Mitigation Planning Handbook.

Barnes County

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Downed power lines and trees • Can contribute to the spread of wildland fires • Loss of economy and crops • Damage to structures and grain bins collapsing from straight line winds • Decreased visibility from wind-blown debris, dirt, and vegetation • Possible displacement of an estimated 639 people based on an average household size of 2.29 people in 279 mobile home structures • Property damage, broken windows, flying shingles • Toppled trees, uprooted • Potential for injuries and loss of life • Loss of crop and livestock • Could start a fire of buildings and structures • High winds can spread fires causing damage to buildings and structures • Approximately \$259,681 in crop damage • Increase of crime from broken windows and potential looting |
| Frequency | 3 | <ul style="list-style-type: none"> • Hazard occurs multiple times each year and is a secondary result from severe summer weather or severe winter weather • Strong winds are commonplace in the county throughout the year • Approximately 26 incidents of windstorm between 1965 and 2013 |
| Likelihood | 3 | <ul style="list-style-type: none"> • Cyclical weather patterns could increase or decrease • The hazard is part of the climate in the area • Strong winds and storms are highly likely to occur in the future • Removal of trees and vegetation increases the likelihood of wind impacting structures 50 percent probability based on past occurrences |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Loss of CRP and shelter belts to hold snow back, leads to more ground blizzard conditions • More vulnerable: Five percent of total housing, consists of 119 mobile homes structures • More vulnerable: 24 percent of population (2,632 people) is under the age of 20 and 20 percent consists of people over 65 (2,170 people) • More vulnerable: Lack of building codes in some jurisdictions • More vulnerable: Older structures and housing stock • Less vulnerable: More advanced warning systems and reverse 911 provide people and farmers more time to prepare and take shelter • Less vulnerable: Advanced communication, cell phones, internet and TV • Less vulnerable: Official shelters located throughout the county |
| Capability | 1 | <ul style="list-style-type: none"> • Active county commission • Contract for engineering, planning, and grant writing • GIS services provided by the state and county • Relies on county, state and other agencies for emergency assistance • Does not have financial resources to accomplish projects independently • County has county-wide mutual aid agreement for emergency services |

| | |
|--|---|
| | <ul style="list-style-type: none"> • Active emergency management department with education and outreach available on the department’s website • Maintains capital improvements project list and project funding sources |
|--|---|

Vulnerabilities to County-Owned Buildings and Property

County-owned buildings are susceptible to windstorms. Buildings may not be constructed to sustain excessively high wind speeds. Windstorms damage building roofs, break windows, topple trees and cause other objects and debris to become airborne. Airborne debris can injure people or in rare instances cause death. Depending on the size of the building and the role it plays in day-to-day operations, the vulnerability to windstorm can vary from nominal for larger structures such as the Barnes County Courthouse in Barnes to severe for county shops in smaller cities, which may be considerably less sturdy. A summary of city and county owned buildings is provided in Chapter 4.

Vulnerabilities of Critical Facilities and Infrastructure

Critical facilities such as schools, water towers, roadways and other specialty facilities such as nursing homes and assisted living facilities are vulnerable to windstorms in a similar fashion to county-owned buildings and property. Infrastructure such as power lines are susceptible to wind and debris, which can disrupt service and cause power outages. Disruptions in water service can be caused by damage to water towers or power lines. Roadways can become blocked due to windblown debris, limiting access for emergency services.

Vulnerabilities to New and Future Development

Building codes ensure buildings and structures are built adequately to better withstand high wind. The cities of Fingal, Kathryn, Leal, Nome, Oriska, Sanborn, and Valley City have adopted building codes while the cities of Dazey, Litchville, Pillsbury, Rogers, Sibley and Wimbledon have not. This lack puts these cities are more at risk to damage and impacts from windstorms as a result. Jurisdictions with a high number of trailer and mobile homes, which are more susceptible to hazards such as a windstorm, may experience more impact from the hazard. However, the city of Valley City is the only jurisdiction with a building inspector for enforcement.

As populations grow, more people are at risk to injury and potential death from windstorms and windblown debris such as tree branches. Strengthening of buildings codes would mitigate impacts.

Data Limitations and Other Key Documents

Recent history indicates more windstorms. This may be an increase in the amount of windstorms, or past windstorms may not have been independently recorded in county history events. High winds are also an aspect of severe summer weather and severe winter weather. Windstorm impacts and damages may be categorized under another hazard and not classified as a windstorm event.

Other key documents related to the windstorm hazard include:

- Barnes County Emergency Operations Plan
- North Dakota Emergency Operations Plan, Severe Storms Annex

Hazard Profile and History

The following detailed narratives were moved forward from the 2010 Barnes County MHMP. Figure 5.14.3 shows the number of windstorm events occurring in North Dakota by county between 2000 and 2013. Table 5.14.3 provides details on crop loss from windstorms.

The following detailed narratives were moved forward from the 2010 Barnes County MHMP.

June 1957, Strong winds associated with an F-5 tornado traveled through southern Barnes County before the tornado hit Fargo and points east. The tornado damaged 1000 homes and killed five people in Fargo and left a debris trail for 60 miles.

August 18, 1994, Thunderstorm winds 30 miles south of Fingal resulted in \$20,000 in property damage.

May 17, 1996, Thunderstorm winds caused damage to a farm near Valley City. Property damage as a result of this storm is estimated at \$10,000. Crop damage as a result of this storm is estimated at \$50,000.

July 5, 1996, Large trees were blown down in Sibley. Property damage as a result of this storm is estimated at \$1,000.

August 31, 1997, Several trees were blown down in Dazey. Property damage as a result of this storm is estimated at \$1,000. Large branches were blown down in Leal.

September, 1, 1997, The strong wind destroyed three grain bins, ripped the doors off a machine shed, and caused roof damage to the farm buildings five miles northeast of Fingal. A new grain auger was also destroyed. Property damage as a result of this storm is estimated at \$100,000.

November 2, 1997, A strong low pressure system created an intense pressure gradient across the Red River Valley area, producing wind gusts up to 47 knots. Several inches of fresh snow were blown around by the strong wind, causing low visibilities.

June 25, 1999, Several trees were blown down 15 miles north of Valley City. Property damage as a result of this storm is estimated at \$1,000. Large tree limbs were blown down near Pillsbury. Property damage as a result of this storm is estimated at \$1,000.

July 3, 1999, Tree limbs were blown down in Rogers. Property damage as a result of this storm is estimated at \$1,000. Winds of 52 knots were reported in Sanborn. Seven miles northwest of Valley City, a camper and several tents were overturned at Bald Hill Dam Campground. One tent, with the two occupants inside, was picked up by the wind and carried a short distance away. Several docks were destroyed and several boats were pushed on shore. Property damage as a result of this storm is estimated at \$50,000. A mobile home was overturned at Martin's Landing, nine miles northwest of Valley City. Property damage as a result of this storm is estimated at \$10,000. Trees were blown down seven miles north of Valley City. Property damage as a result of this storm is estimated at \$1,000.

November 1, 1999, A strong pressure gradient developed across the northern plains, between a

low over southern Ontario and a high building in from Montana. The peak was reported at Devils Lake, where a gust of 76 mph was reported. The Grand Forks Air Force Base has a gust of 66 mph and Fargo had a gust of 56 mph. Damage was uniform across eastern North Dakota, with the larger cities sustaining the brunt of the damage. A motel in Devils Lake had a portion of its roof blown off. Waves were 8 feet high on Devils Lake, crossing over the top of Highway 57 in spots. Several buildings in Lakota were damaged, and one pole barn north of town was flattened. A wildfire burned over 800 acres of grassland and an abandoned farmstead near Tolna. Numerous other smaller fires had to be extinguished by rural fire departments. Three semi trucks were blown over, one in Grand Forks and two near Pembina. Trees fell on cars, homes and power lines. Minor power outages were reported. Damage to roofs, fences, signs and traffic signals were also common. Property damage as a result of this storm is estimated at \$590,000.

April 5, 2000, A strong low pressure system moved along the Canadian border, with a tight pressure gradient behind it. The strongest winds (62 knots) were along the southwest flank of the low, generally south of a line from Devils Lake, North Dakota, to Park Rapids, Minnesota. Many trees were blown down, several buildings were damaged, and localized power outages were reported. Most of the property damage was reported in the Lisbon area. Property damage as a result of this storm is estimated at \$100,000.

July 2001, A microburst or tornado hit Fingal breaking or pulling nearly full sized tree out of the ground and cutting power. All streets in town were blocked. Debris removal took weeks.

July 20, 2001, 12:50 AM CST – July 20, 2001, 12:50 AM CST

Wind caused numerous large tree branches broken 2 miles northeast of Rogers causing property damage of 2K.

July 21, 2001, 2:10 AM CST – July 21, 2001, 6:00 AM CST

A power line was blown down in Dazey and large branches in Valley City with winds of 56 kts. Property damage was estimated at 11K.

July 31, 2001, 1:40 AM CST – July 31, 2001,

Large trees were uprooted around Lake Ashtabula, falling on cars, decks, and houses. Boats, pontoons, jet skis, and boat lifts were also damaged 7 miles north of Valley City. Winds were at 70 kts causing property damage of 152K.

August 8, 2001, 7:35 PM CST – August 8, 8:15 PM CST

Hail was reported .75 inches in Valley City and .88 inches 2 miles southwest of Rogers and Fingal. Winds caused downed branches 2 miles southwest of Rogers. The strong wind blew trees and power lines down, knocking out power to 25 percent of the city. The most wind damage was near Valley City State University. Many trees and power lines were blown down and several roofs were damaged causing property damage of 266K.

August 14, 2001, 11:00 PM CST – August 14, 2001, 11:00 PM CST

Winds caused trees down 2 miles northeast of Rogers.

November 1, 2001, 4:20 AM CST – November 1, 2001, 3:21 PM CST

The wind gusted as high as 47 mph. A 1.3 foot diameter tree trunk was snapped about 8 feet above the ground 1.5 miles north of Petersburg.

February 11, 2002, 12:00 PM CST – February 11, 10:00 PM CST

A strong area of surface low pressure moved across southern Ontario, with a tight surface pressure gradient across eastern North Dakota. The day began with record warmth and was followed by the gusty wind. Barnes County reported winds of 50 kts.

June 30, 2002, 1:10 AM CST – June 30, 2002, 2:15 AM CST

Hail was reported 1.00 inches 2 miles east southeast of Pillsbury. Trees were blown down 4 miles north of Valley City.

July 17, 2002, 10:00 AM CST – July 17, 2002, 10:30 AM CST

Hail was reported 1.00 inches 6 miles southwest of Sibley and 2.00 inches 3 miles north of Oriska. A semi truck was blown off Interstate 94.

July 31, 2002, 11:45 PM CST – July 31, 2002, 11:55 PM CST

Hail was reported 1.50 in Pillsbury with wind gusts of 58 mph measured at an NDAWN mesonet site.

August 31, 2002, 9:38 PM CST – August 31, 2002, 10:15 PM CST

Hail was reported 2.50 inches 5 miles west northwest of Valley City. Winds caused tree damage 3 miles southwest of Oriska.

September 2, 2002, 2:30 AM CST – September 2, 2002, 2:45 AM CST

Hail was reported .75 inches 10 miles northwest of Litchville. Tree branches were snapped off 7 miles west northwest of Litchville.

June 21, 2003, 7:25 PM CST – June 21, 2003, 7:45 PM CST

Winds of 52 kts were reported 52 kts in Litchville and Oriska. Trees and large tree limbs were blown down causing some power outages in Valley City.

June 24, 2003, 9:12 PM CST – June 24, 2003, 9:35 PM CST

Numerous large branches and trees were blown down. Many power lines were also blown down with scattered power outages in Valley City with winds of 70 kts. Large 30,000 bushel steel grain bins at the Peak elevator complex were crushed by the wind. Numerous large trees were

also blown down and augers were twisted and broken with winds of 96 kts. Eighteen 80 foot tall 345 kV high voltage power transmission towers were blown down in several sections to the Cass County line. A section of Highway 32 north of Oriska was briefly closed where the wires fell on the road. A 112 mph wind gust was measured at a Minnkota Power Company wind turbine site 4 miles east southeast of Valley City. Power lines were blown down over the highway 3 miles north of Oriska with winds of 90kts. 7 large grain bins were damaged at the Evergreen Farmers Cooperative 5 miles northeast of Oriska. Numerous large trees were snapped off at the base 4 miles east southeast of Oriska.

March 10, 2004, 3:15 PM CST – March 10, 2004, 8:00 PM CST

A cold front raced through the area, bringing gusty northwest winds in its wake. Wind speeds across the area were sustained around 40 mph with a few gusts to 60 mph. The wind also blew around snow, resulting in reduced visibilities in open country. Magnitude: 52 kts.

March 10, 2005, 3:30 AM CST – March 10, 2005, 11:50 AM CST

A strong cold front moved through the northern plains, as an area of surface low pressure dropped into the Minnesota arrowhead. This brought a period of very strong north to northwest winds to the higher elevations just west of the Red River Valley. Winds were from 40 to 62 mile per hour.

November 8, 2005, 6:49 PM CST – November 9, 2005, 4:29 PM CST

An area of surface low pressure took shape over southeast Montana on November 8, 2005. The low tracked east into north central South Dakota, shifted northeast toward Grand Forks, ND before finally exiting into southwest Ontario. On 11-09-08 the low had deepened to 988 mb. With the rapidly deepening surface low pressure system, northwest winds also became quite strong once the low passed into Canada.

January 24, 2006, 6:30 AM CST – January 24, 2006, 7:30 AM CST

Wind gusts of 58 miles per hour were measured at the Dazey NDAWN site in northern Barnes County.

June 11, 2008, 7:30 AM CST – June 11, 2008, 3:00 PM CST

Many large trees and a grain bin were blown down in Litchville. Many trees were also blown down in Valley City, and in the area between Litchville and Valley City. Some trees and branches knocked down power lines, which resulted in power outages. A barn was blown down 10 miles north of Valley City. High winds developed across portions of east central and southeast North Dakota Wednesday (11th) morning. The winds were thought to be the result of a wake low. Property damage \$300K and crop damage \$200 K. Afternoon heating led to convective overturning and increased episodes of high winds mixing down to the ground. High sustained winds and frequent high wind gusts occurred across portions of west central Minnesota between about 2 pm and 5 pm CDT. Approximately 1 mile west of Rogers, large three to four inch diameter branches were knocked down by the wind. An area of surface low pressure was located over east central South Dakota at 18z Wednesday (11th), with a very tight surface pressure

gradient to its east and northeast (into southeast North Dakota). Wind speeds in the low levels of the atmosphere were also quite strong, and when mixed down to the surface produced some severe wind gusts. Thunderstorms also produced some scattered hail. Property damage \$10K and crop damage \$100K.

June 14, 2008, 6:11 PM CST – June 14, 2008, 6:32 PM CST

The wind gust was measured by the NDAWN wind sensor along Highway 26. Eastern North Dakota and northwestern Minnesota were hit by widespread severe thunderstorms Saturday (14th) afternoon and evening. Most of the thunderstorms fired along a cold front. Winds recorded 2miles east of Dazey at 50 kts. Twelve miles northwest of Valley City reported winds at 61 kts. with 0.88 inch hail. A tornado (F0) tracked intermittently for about 4 miles starting at 4miles northeast of Koldok and crossed into Cass County. Property damage estimated at \$20K and crop damage at \$40K. It then continued for about one more mile before it lifted about 2 miles northeast of Tower City by 741 pm CDT. A few large branches were broken down in shelterbelts. Peak winds were estimated at 80 mph.

June 24, 2008, 9:00 PM CST – June 24, 2008, 9:00 PM

An old granary was thrown fifty feet, and the wind knocked down two to three inch diameter branches down. Severe thunderstorms developed over western North Dakota Tuesday (24th) evening, then spread east-southeast into portions of eastern North Dakota. Wind gusts of at least fifty knots were reported across parts of Barnes, Cass, and Richland Counties, which was the area with the best elevated instability. Property damage around the Hastings area was \$50K and crop damage at \$20K.

October 26, 2008, 5:00 AM CST – October 26, 2008, 9:00 AM CST

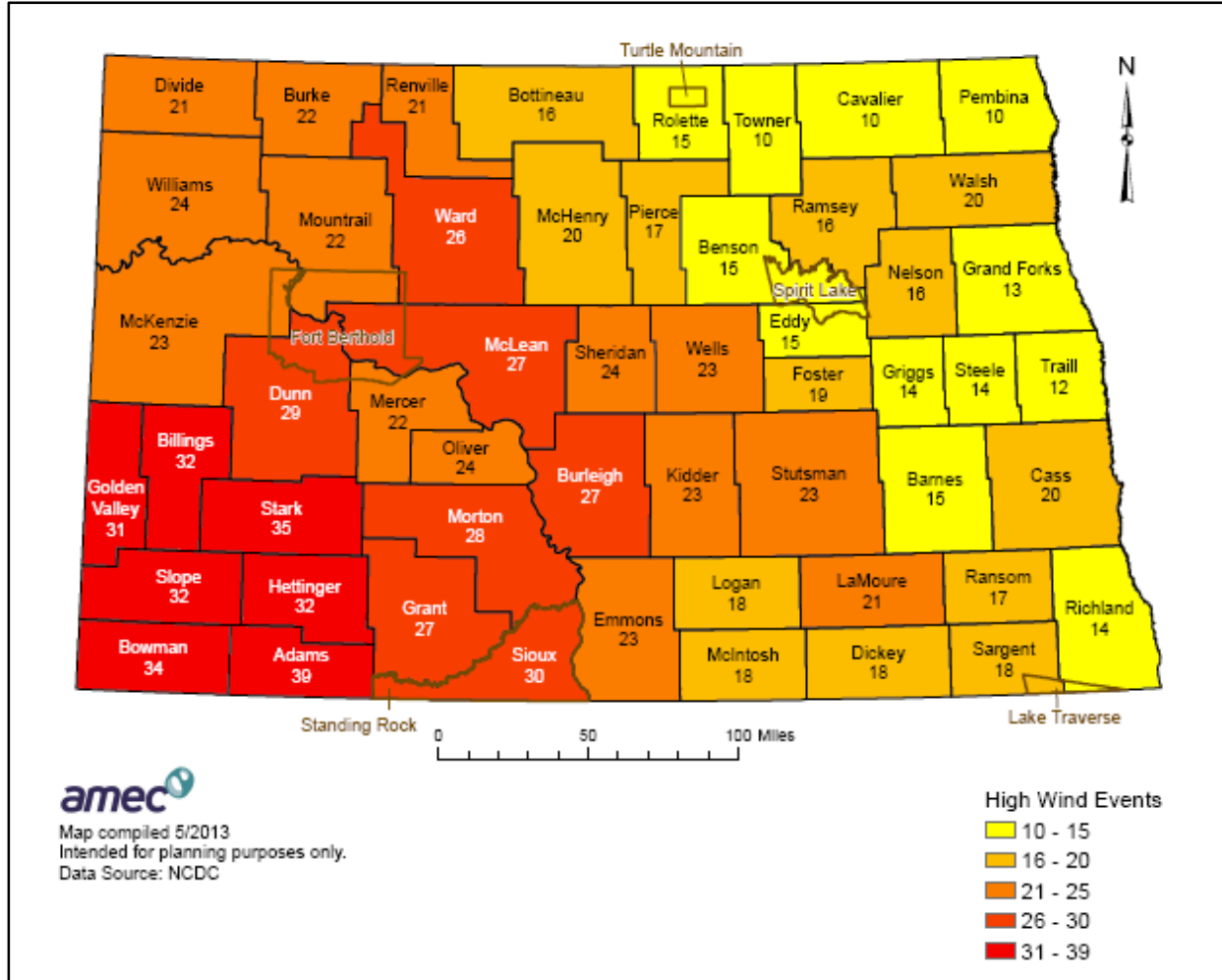
A cold front moved through the northern plains on the afternoon of the 25th, bringing strong northwest winds in its wake. The corridor of strongest winds extended from Cando to Finley to Fargo/Moorhead to Fergus Falls, where strong cold advection brought sustained winds of 40 mph. Barnes County reported winds of 35 kts.

January 31, 2009, 12:21 PM CST – January 31, 2009, 6:00 PM CST

An area of surface low pressure moved across southern Canada, with gusty northwest winds in its wake. Wind speeds were sustained around 40 mph with a few locations experiencing gusts to 58 mph. Barnes County reported wind of 40 kts.

Data from the 2014 NDMHMP shows 15 windstorm events between 2000 and 2013 in Barnes County resulting in a probability of 100 percent. The frequency of wind events were similar in Barnes County to neighboring counties in the southeast portion of North Dakota.

Figure 5.14.3 – 2000 to 2013 High Wind Events by North Dakota County



Source: N.D. Department of Emergency Services

Crop losses from windstorm is tracked by the United States Department of Agriculture Risk Management Agency (RMA). Table 5.14.3 shows crop loss data in Barnes County between 1990 and 2013. The RMA provides data on the crop type affected, net claimed acres, indemnity, loss liability, loss cost and the number of policies covered. The net claimed acres is the total acres planted for crops in the county for the given year. Liability is the total value in crops planted in the county for the given year and indemnity is the amount paid to cover insurance claims from crop loss due to disease.

Table 5.14.3 – 1990 to 2013 Barnes County Crop Loss from Windstorm Events

| Crop Year | Crop | RMA COL | Net Claimed Acres | Indemnity | Loss Liability | Loss Cost | Policy Count |
|------------------|-------------|----------------|--------------------------|------------------|-----------------------|------------------|---------------------|
| 1990 | Sunflowers | Wind | 567 | 19,807 | 37,372 | 53% | 15 |
| 1990 | Corn | Wind | 215 | 8,042 | 14,192 | 57% | 6 |
| 1990 | Sunflowers | Wind | 411 | 15,948 | 28,300 | 56% | 6 |
| 1991 | Sunflowers | Wind | 524 | 13,226 | 39,288 | 34% | 13 |
| 1994 | Sunflowers | Wind | 637 | 31,037 | 47,609 | 65% | 9 |
| 1994 | Wheat | Wind | 444 | 24,785 | 31,554 | 79% | 4 |
| 1997 | Sunflowers | Wind | 896 | 32,625 | 84,570 | 39% | 6 |
| 1999 | Sunflowers | Wind | 237 | 9,393 | 21,137 | 44% | 7 |
| 2001 | Sunflowers | Wind | 810 | 32,854 | 72,530 | 45% | 15 |
| 2001 | Barley | Wind | 157 | 6,957 | 8,986 | 77% | 5 |
| 2010 | Sunflowers | Wind | 671 | 65,007 | 142,384 | 46% | 5 |
| Total | | | 5,569 | \$259,681 | \$527,922 | 49% | 91 |

Source: U.S. Department of Agriculture, Risk Management Agency

6. Mitigation Strategy

Mitigation Purpose, Goals, and Projects

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals and specific mitigation projects for each incorporation jurisdiction based on the risk assessment developed at Planning Committee and jurisdictional meetings. A total of 90 projects were identified. All hazards and threats were considered and mitigation projects were formulated based on the potential or previous effects of hazards, the high probability of hazard or threat occurrences, the vulnerability of jurisdictions to hazards, and hazards each project can mitigate against. The problem statement for Barnes County, which assisted in formulating specific mitigation actions to reduce the impacts of hazards, is shown before the mitigation actions.

The following are the six goals that were reviewed, updated and approved:

Goal 1: Improve public awareness of hazards.

Goal 2: Implement education programs for people to protect themselves.

Goal 3: Improve planning and regulation in jurisdictions to mitigate hazards.

Goal 4: Reduce impact of hazards.

Goal 5: Improve resiliency of critical facilities and infrastructure.

Goal 6: Provide places of refuge and early warnings for public and vulnerable populations to take protective action during hazard events.

Mitigation Project Development

The Planning Committee identified the following characteristics of each mitigation project and is included each project profile:

- Description/benefit
- Hazard(s) addressed
- Project status
- Priority
- Responsible agency
- Partners
- Timeframe for completion
- Cost and
- Funding sources

Scoring and Prioritization

The Plan Update Committee also scored and ranked projects based on a FEMA process – STAPLEE – that allows a community to understand the support for a project; the potential costs in dollars, time and expertise; environmental impact; and the benefit of the project. The specific words in the acronym STAPLEE are social, technical, administrative, political, legal, economic, and environmental.

Each project was scored using a one to five (1 to 5) scoring. A score of one (1) indicated a project is ineffective, not feasible and/or too costly, and a five (5) indicated the project was highly effective, feasible and/or a higher benefit compared to cost. A score of three (3) was neutral.

Each mitigation project included in the plan is valuable as it addresses needs specific to Barnes County and its jurisdictions. Due to a variety of constraints, not all projects can be implemented simultaneously and must be prioritized with the most critical projects being emphasized for implementation in the near term. However, the prioritization of each project can change over time to respond to changes in a community and to take advantage of resources that become available.

The Plan Update Committee prioritized each mitigation on a high, medium and low designation based on scoring of the documentation, past experiences and professional judgment, and what projects are technically feasible to accomplish is based on the capabilities of all jurisdictions. Table 6.1 on the following page summarizes the projects by priority by Jurisdiction.

Table 6.1 – Prioritization of Mitigation Projects by Jurisdiction

| Jurisdiction | Project Number by Prioritization | | |
|---------------------|---|-------------------|---|
| | Low | Medium | High |
| Barnes County | 2, 7 | 13, 22, 29 | 1, 3, 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 28, 30 |
| Dazey | – | – | 1, 2, 3 |
| Fingal | – | 1 | 2, 3 |
| Kathryn | 1 | – | 2, 3, 4, 5 |
| Leal | – | – | 1, 2 |
| Litchville | – | 2 | 1 |
| Nome | 4 | – | 1, 2, 3 |
| Oriska | – | 4 | 1, 2, 3 |
| Pillsbury | – | – | 1, 2, 3 |
| Rogers | – | – | 1, 2, 3 |
| Sanborn | – | 2 | 1, 3, 4, 5 |
| Sibley | – | – | 1, 2, 3, 4, 5 |
| Valley City | 17 | 5, 11, 13, 15, 16 | 1, 2, 3, 4, 6, 7, 8, 9, 10, 12, 14 |
| Wimbledon | – | – | 1, 2, 3 |

Acronyms

The acronyms used in the mitigation projects profiles are described as follows:

| Acronym | Entity |
|-------------------|--|
| BRWD | Barnes Rural Water District |
| County Road Dept. | Barnes County Road Department |
| DWU | Dakota Water Users |
| Dept. of Commerce | N.D. Department of Commerce |
| EM | Barnes County Emergency Manager |
| Extension Service | NDSU/Barnes County Extension Service |
| FEMA | Federal Emergency Management Agency |
| FSA | USDA Farm Service Agency |
| KLJ | Kadrmass, Lee & Jackson |
| NDDDES | N.D. Department of Emergency Services |
| NDDOT | N.D. Department of Transportation |
| NDTOA | N.D. Townships Officers Association |
| NRCS | USDA Natural Resources Conservation Service |
| NWS | National Weather Service |
| Public Utilities | Bek Communications, Dakota Central, Dickey Rural Networks, Inter-Community Telephone Company, Mid-Continent, Montana-Dakota Utilities, Qwest, Otter Tail Power Company |
| Public Works | Valley City Public Works |
| Red Cross | American Red Cross |
| Regional Council | South Central Dakota Regional Council |
| RD | USDA Rural Development |
| Social Services | Barnes County Social Services |
| SWC | N.D. State Water Commission |
| USACE | United States Army Corps. of Engineers |
| WRD | Barnes County Water Resource District |

Problem Statements

Problem statements provide a concise description of the vulnerabilities of the jurisdiction to threats and hazards that should be addressed through mitigation actions. The specific mitigation actions to reduce the impacts of hazards are identified for each jurisdiction and are found after the problem statement. The problem statements and jurisdiction-specific mitigation projects can be found in Chapter 8, Jurisdictions.

Barnes County

Barnes County is impacted by communicable disease, dam failure, drought, flood, geologic hazards, hazardous material release, homeland security incident, severe summer weather, severe winter weather, shortage or outage of critical materials or infrastructure, transportation accidents, urban fire/structure collapse, wildland fire, and windstorm. Flooding is a major issue in many communities due to the presence of a high water table, closed basins, and the Sheyenne River traversing through the county. Many communities experience isolation from impacts of hazards due to the rural nature of the county. The county has planning and regulatory, administrative and technical, financial, and education and outreach capabilities to accomplish mitigation. However, the county relies on outside sources for construction of permanent flood control measures and other large-scale mitigation projects. Permanent flood protection, flood control measures, education and outreach, drainage, upgrading of critical facilities and infrastructure, upgrading of emergency sirens and construction of additional storms shelters are a priority for the county.

Barnes County Project 1: Use Barnes County Emergency Management website and local media outlets to improve household disaster preparedness.

| | |
|--------------------------|---|
| Description/Benefit | To keep households ready in case of a disaster. |
| Hazards Addressed | All hazards |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager Radio Stations: KSJB, KQDJ, KDDR Newspapers: Valley City Times-Record and Litchville Bulletin Digital Media: Bek Communications, CSI, Daktel, DRN, ICTC, Mid-Continent, Qwest, Satellite/DirecTV |
| Partners | NDDES, Red Cross, FEMA, NWS, city & county governments, health districts, social services |
| Timeframe for Completion | Ongoing |
| Cost | \$0 to \$1,000 annually |
| Funding Source | County, state, federal, city, private |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

Barnes County Project 2: Increase awareness of drought tolerant practices in farming and municipalities.

| | |
|--------------------------|---|
| Description/Benefit | Make public aware of farming, crop programs and use of green (recycled) water. Educating the public on rationing/restrictions on water usage. |
| Hazards Addressed | Drought, Fire |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | Continue |
| Priority | Low |
| Responsible Agency | Barnes County Water Resource District Manager Bruce Anderson Extension Service, FSA, Agroline, ADM-Benson Quinn |
| Partners | Fire departments/districts, soil conservation, elevators, city/county government, EM, SWC, USACE |
| Timeframe for Completion | 1 year or less |
| Cost | \$1,500 per year |
| Funding Source | Grants (state, federal, utilities), local budgets |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 5 | 5 | 3 | 4 | 5 | 31 |

Barnes County Project 3: Make public aware of risk of shortage of critical materials and/or infrastructure and encourage citizens to be self-sufficient.

| | |
|--------------------------|--|
| Description/Benefit | Make public aware of risk of shortage of critical materials and/or infrastructure and encourage citizens to be self-sufficient. Educate residents on the importance of shelter-in-place. |
| Hazards Addressed | Shortage or Outage of Critical Materials or Infrastructure |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager Barnes County Sheriff Valley City Police Department Chief of Police |
| Partners | Social services, EM, fire departments and districts, health districts, public utilities, county/city government, fuel suppliers |
| Timeframe for Completion | 6 months or less |
| Cost | \$1,500 to \$2,000 |
| Funding Source | Grants (state, federal, utilities) |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 5 | 5 | 4 | 4 | 5 | 32 |

Barnes County Project 4: Increase awareness of methods for prevention of communicable diseases.

| | |
|--------------------------|---|
| Description/Benefit | Make public aware of risk of communicable diseases and methods for prevention in people; animals and crops for economic impact. |
| Hazards Addressed | Communicable Disease |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | City-County Health Director |
| Partners | Central Valley Health District, social services, EM, fire departments and districts, county/city government |
| Timeframe for Completion | Ongoing |
| Cost | \$300 for a PSA, \$1,000 to \$3,000/week for substantial outreach |
| Funding Source | Grants (state, federal, utilities), county budget |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 5: Increase awareness of hazardous materials.

| | |
|--------------------------|--|
| Description/Benefit | Make the public aware of risk from hazardous materials and keep informed on current railroad shipping methods, storage sites and weather events. |
| Hazards Addressed | Hazardous Material Release (All) |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | Ongoing and Continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager BNSF and CPR Agriculture companies |
| Partners | City, state, federal, local government |
| Timeframe for Completion | Ongoing |
| Cost | Free – through media |
| Funding Source | Local, state, federal, private |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 6: Assure continuous and effective operation of Code Red/emergency telephone notification system and promote residents to sign up.

| | |
|--------------------------|---|
| Description/Benefit | Keep public informed on current weather events and maintain communication in cell phone outage areas. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager |
| Partners | Digital Media: Bek Communications, CSI, Daktel, DRN, ICTC, Mid-Continent, Qwest, Satellite/DirecTV Barnes County Commission |
| Timeframe for Completion | Ongoing |
| Cost | \$3,00 to \$5,000 per year |
| Funding Source | Local, state, federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 7: Encourage farmers and general public to have insurance to protect from property losses from hazards.

| | |
|--------------------------|---|
| Description/Benefit | Benefit to crop insurance, residential conservation practices, and property insurance. |
| Hazards Addressed | Drought, Flood, Severe Summer Weather |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | New |
| Priority | Low |
| Responsible Agency | FSA, private insurance companies |
| Partners | EM, county extension, agricultural producers |
| Timeframe for Completion | Ongoing |
| Cost | \$0 |
| Funding Source | Local, state, federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 21 |

Barnes County Project 8: Increase education and awareness of fire safety and prevention.

| | |
|--------------------------|--|
| Description/Benefit | Make the public aware of methods to remain safe from risk of fire and potential prevention methods. Keep areas around buildings and structures clear grass, overgrown vegetation and debris. |
| Hazards Addressed | Urban Fire/Structure Collapse, Wildland Fire |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Fire departments/districts |
| Partners | City, state, federal, local government, EM, ambulance and police, City-County Health, Central Valley Health District |
| Timeframe for Completion | 6 months – ongoing |
| Cost | \$10,000 to \$15,000 |
| Funding Source | Local, state, federal, private |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 9: Encourage jurisdictions to review and update or implement ordinances to address new development.

| | |
|--------------------------|--|
| Description/Benefit | Build the planning and regulatory capability of incorporated jurisdictions through plans, policies, and ordinances. Dndustrial development in Spiritwood Township in Stutsman County to the west, in addition to growth and development in Cass County in the east, will impact Barnes County. Growth will most likely be concentrated in Valley City and other jurisdictions along Interstate 94. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Planning Commission, city councils |
| Partners | City, state, federal, local government |
| Timeframe for Completion | Yearly |
| Cost | \$0 to \$500 |
| Funding Source | Local, state, federal, private |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 28 |

Barnes County Project 10: Encourage jurisdictions to create and implement capital improvement plans that address infrastructure vulnerable to hazards.

| | |
|--------------------------|--|
| Description/Benefit | To ensure maintenance and improvement of capital investments and incorporate mitigation actions to reduce future losses. |
| Hazards Addressed | All |
| Affected Jurisdictions | Dazey, Leal, Litchville, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | City councils |
| Partners | Engineers, regional council, Dept. of Commerce, N.D. League of Cities, N.D. Association of Counties, NDTOA |
| Timeframe for Completion | Yearly |
| Cost | \$1,000 to \$1,200 |
| Funding Source | Local budgets, grants, RD |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 11: Encourage jurisdictions to adopt State Building Codes.

| | |
|--------------------------|--|
| Description/Benefit | To ensure new and existing structures adhere to building standard to withstand impacts from hazards. |
| Hazards Addressed | All |
| Affected Jurisdictions | Dazey, Litchville, Pillsbury, Rogers, Sibley, Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | City councils |
| Partners | Dept. of Commerce, N.D. League of Cities, N.D. Association of Counties, NDTOA |
| Timeframe for Completion | Yearly |
| Cost | \$1,500 to \$2,000 |
| Funding Source | Local, state, federal budgets |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 12: Assure Barnes County has FEMA-Approved Mitigation Plan.

| | |
|--------------------------|--|
| Description/Benefit | Continuous assessing of jurisdictional vulnerabilities and update of hazards and impacts. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | Done. Ongoing and continue. |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager |
| Partners | Barnes County Commission, city councils, NDDDES, regional council |
| Timeframe for Completion | 4 to 5 years |
| Cost | \$30,000 to \$50,000 |
| Funding Source | Local, state, federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 13: Strengthen building codes and land use regulations.

| | |
|--------------------------|---|
| Description/Benefit | To ensure new and existing structures adhere to building standards to withstand impacts from hazards. Improve land use regulations to increase responsible management of land resources and avoid development in areas vulnerable to hazards. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | Continue |
| Priority | Medium-High |
| Responsible Agency | Barnes County Planning Commission, city councils |
| Partners | Dept. of Commerce, N.D. League of Cities, N.D. Association of Counties, NDTOA |
| Timeframe for Completion | Ongoing |
| Cost | \$2,000 per review |
| Funding Source | Local, state, federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 4 | 5 | 33 |

Barnes County Project 14: Assure new development is built in areas with low risk to hazards.

| | |
|--------------------------|--|
| Description/Benefit | Limit losses of life and property from hazards. To ensure new development can provide highest positive impact to communities. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Planning Commission, city councils |
| Partners | Dept. of commerce, N.D. League of Cities, N.D. Association of Counties, NDTOA |
| Timeframe for Completion | Ongoing |
| Cost | \$2,000 per year/review |
| Funding Source | Local, state, federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 4 | 5 | 33 |

Barnes County Project 15: Create post-disaster debris management plan.

| | |
|--------------------------|--|
| Description/Benefit | Provide temporary staging site for disposal of waste for all communities in the county and improve quality of life. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager, City-County Health Director, Townships |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council, NDDH |
| Timeframe for Completion | 1 to 3 years |
| Cost | Up to \$1,000 |
| Funding Source | Local, State, Federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 3 | 1 | 5 | 5 | 29 |

Barnes County Project 16: Remove existing structures from flood prone areas.

| | |
|--------------------------|--|
| Description/Benefit | Economic resiliency. Residents with property at risk would be protected. Convert former lots into greenway/recreation for improved quality of life. |
| Hazards Addressed | Flood (Overland, Riverine), Geologic Hazard (Landslide) |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager, city councils |
| Partners | Barnes County Commission, SWC, FEMA, insurance agents, regional council |
| Timeframe for Completion | Ongoing |
| Cost | \$50,000 to \$300,000 depending on the property and structure |
| Funding Source | County and city, state, federal, grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 3 | 5 | 5 | 3 | 5 | 2 | 5 | 28 |

Barnes County Project 17: Remove existing structures from areas prone to geologic hazards.

| | |
|--------------------------|---|
| Description/Benefit | Economic resiliency. Residents with property at risk would be protected. Convert former lots into open space or wildlife habitat. |
| Hazards Addressed | Flood (Overland, Riverine), Geologic Hazard (Landslides) |
| Affected Jurisdictions | Barnes County, Sibley, Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager Barnes County Water Resource District Manager Barnes County Planning and Zoning Administration Valley City City Administrator / Valley City City Commission Sibley City Council |
| Partners | Barnes County Commission, FEMA, SWC, engineering firms, regional council |
| Timeframe for Completion | Ongoing |
| Cost | \$50,000 to \$300,000 depending on the property and structure |
| Funding Source | County and city, state, federal, grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 4 | 5 | 5 | 3 | 5 | 2 | 5 | 29 |

Barnes County Project 18: Encourage participation in NFIP to mitigate impacts of flooding.

| | |
|--------------------------|---|
| Description/Benefit | Economic resiliency. Residents with property at risk would be insured. |
| Hazards Addressed | Flood (Riverine) |
| Affected Jurisdictions | Barnes County, Kathryn, Litchville, Valley City |
| Project Status | Ongoing and continue. |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager Barnes County Floodplain Administrator Kathryn City Council Litchville City Council Valley City City Commission |
| Partners | Barnes County Commission, state, FEMA, insurance agents |
| Timeframe for Completion | Ongoing |
| Cost | \$500 to \$1,000 per year |
| Funding Source | County and city, state, federal, grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 19: Review of ordinances to assure jurisdictions meet minimum federal and state requirements to comply with NFIP.

| | |
|--------------------------|---|
| Description/Benefit | To ensure program benefits are available to residents and jurisdictions. |
| Hazards Addressed | Flood (Riverine) |
| Affected Jurisdictions | Barnes County, Kathryn, Litchville, Valley City |
| Project Status | Ongoing and continue. |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager Barnes County Floodplain Administrator Kathryn City Council Litchville City Council Valley City City Commission |
| Partners | Barnes County Commission, state, FEMA, insurance agents |
| Timeframe for Completion | Ongoing |
| Cost | \$500 to \$1,000 per year |
| Funding Source | County and city, state, federal, grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 20: Create a plan identifying alternative water sources for fire suppression.

| | |
|--------------------------|--|
| Description/Benefit | Assure water to fight fires. Creeks, rivers, lakes, sloughs, irrigation wells, rural water, and water tenders at major agriculture chemical companies. |
| Hazards Addressed | Drought, Hazard Material Release, Transportation Accident, Urban Fire/Structure Collapse, Wildland Fire |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager, fire departments/districts |
| Partners | SWC, USACE, BRWD, DWU, agriculture companies, N.D. Game & Fish |
| Timeframe for Completion | 1 year |
| Cost | \$2,000 |
| Funding Source | Local, state and federal, grants, fundraisers, local fire budgets. |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 4 | 5 | 4 | 5 | 4 | 5 | 4 | 31 |

Barnes County Project 21: Relocate existing propane, anhydrous and fuel tanks, and fertilizer plants away from residential areas and community assets to areas with conducive uses.

| | |
|--------------------------|---|
| Description/Benefit | Assure adequate equipment and training to address situation resulting from fires and other hazards from the scope of their abilities. |
| Hazards Addressed | Hazardous Material Release, Homeland Security Incident, Flood, Severe Summer Weather, Severe Winter Weather, Transportation Accident, Urban Fire/Structure Collapse, Wildland Fire, Windstorm |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager, fire departments/districts |
| Partners | Elevators, cities, county. Fuel, propane and chemical companies. |
| Timeframe for Completion | 5 to 10 years |
| Cost | Project specific |
| Funding Source | Local, state and federal, grants, fundraisers, local fire budgets. |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 3 | 4 | 4 | 5 | 30 |

Barnes County Project 22: Install solar-powered electronic Fire Danger Index Signs along highways and county roads near jurisdictions.

| | |
|--------------------------|---|
| Description/Benefit | Identifying proper locations to implement signage that is most effective. Reduce risk of fire hazard from outdoor burning by residents. |
| Hazards Addressed | Drought, Hazard Material Release, Wildland Fire |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Nome, Oriska, Pillsbury, Rogers, Wimbledon |
| Project Status | New |
| Priority | Medium |
| Responsible Agency | Barnes County Commission, Barnes County Emergency Manager, Barnes County Highway Superintendent, fire departments/districts |
| Partners | City councils, EM, N.D. Attorney General-Fire Marshal Division, highway depts. |
| Timeframe for Completion | 3 to 5 years |
| Cost | Up to \$5,000 |
| Funding Source | Local, state and federal, grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 4 | 2 | 1 | 2 | 4 | 2 | 2 | 17 |

Barnes County Project 23: Create plans for loss of services.

| | |
|--------------------------|--|
| Description/Benefit | Sheltering-in-place, Evacuating, Water and Fuel Rationing, Triage Medicine. |
| Hazards Addressed | Flood, Shortage or Outage of Critical Materials or Infrastructure, Severe Summer Weather, Severe Winter Weather |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager, City-County Health Director, city councils |
| Partners | Social services, fire departments and districts, public utilities, Central Valley Health District |
| Timeframe for Completion | 1 year |
| Cost | Plan specific |
| Funding Source | Grants (state, federal, utilities) |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 24: Install generator at City-County Health.

| | |
|--------------------------|--|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of refrigeration units storing vaccinations. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | New |
| Priority | High |
| Responsible Agency | City-County Health Director |
| Partners | Jurisdictional officials, emergency agencies (ambulance, fire, police), engineering firms, regional council, Central Valley City District |
| Timeframe for Completion | 1 year |
| Cost | \$50,000 to \$100,000 |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 25: Raise road grades to prevent blockage.

| | |
|--------------------------|--|
| Description/Benefit | Raise road grades to prevent blockage. |
| Hazards Addressed | Flood, Severe Summer Weather, Severe Winter Weather |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | Ongoing and continue. |
| Priority | High |
| Responsible Agency | Barnes County Highway Superintendent, township boards |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, EM, NDDOT |
| Timeframe for Completion | Ongoing |
| Cost | Project Specific |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 4 | 5 | 3 | 5 | 5 | 4 | 4 | 30 |

Barnes County Project 26: Engineer or retrofit roads and bridges to withstand hazards.

| | |
|--------------------------|--|
| Description/Benefit | <p>Increase resiliency of roads to provide transportation and maintain access for emergency services in the county.</p> <p><u>Structurally Deficient</u> Bridge #0001-051.506 – North of Highway 46 Bridge #0001-055.61 – 4 miles north of Highway 46 Bridge #02-132-40.0 – 1 mile southeast of Nome Bridge #02-117-03.0 – 3 miles east and 1 mile north of Dazey – Dazey Township Section 4</p> <p><u>Functionally Obsolete</u> Bridge #0094-290.641 – Exit 290, westbound off ramp Bridge #0094-290.803 – Exit 290 Interchange - eastbound Bridge #VC01 – 4th St. SW - east side of park Bridge #02-122-36.0 – 1 mile west and 2 miles north of Kathryn</p> <p><u>Scour Critical</u> Bridge #02-124-39.0 – Southeast of Kathryn – Oakhill Township Bridge #02-124-39.3 – 1 mile east and 1 mile north of Kathryn – Oakhill Township</p> <p><i>Barnes County Highway Superintendent Kerry Johnson has said there are other bridges with scour concerns the county is watching closely.</i></p> |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon, Barnes County Water Resource District |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Highway Superintendent Kerry Johnson Township Boards |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, EM, NDDOT |
| Timeframe for Completion | 5 to 10 years |
| Cost | Project specific |
| Funding Source | County, state and federal grants, private (BMSF) |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 3 | 3 | 3 | 3 | 5 | 28 |

Barnes County Project 27: Assure continued monitoring and maintenance of all dams in Barnes County.

| | |
|--------------------------|---|
| Description/Benefit | To protect human life and property from failures of the Ballhill Dam and Clausen Springs Dam. |
| Hazards Addressed | Dam Failure |
| Affected Jurisdictions | Sibley, Valley City, Kathryn |
| Project Status | Ongoing and continue. |
| Priority | High |
| Responsible Agency | USACE, N.D. Flood Control Project Section Supervisor |
| Partners | EM, state, FEMA, BWRD, N.D Game & Fish, SWC |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | County and city, state, federal, grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

Barnes County Project 28: Maintain Sheyenne River Channel.

| | |
|--------------------------|---|
| Description/Benefit | Maintain flow of runoff to eliminate standing water and control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Flood, Severe Summer Weather, Severe Winter Weather, Windstorm |
| Affected Jurisdictions | Sibley, Kathryn, Valley City |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Water Resource District Manager |
| Partners | Barnes County Commission, EM, SWC |
| Timeframe for Completion | Ongoing |
| Cost | \$50,000 to \$100,000 |
| Funding Source | City, County, State and Federal Grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 4 | 5 | 5 | 34 |

Barnes County Project 29: Reduce the risk of hazardous material release from the Hi-Line Bridge.

| | |
|--------------------------|---|
| Description/Benefit | Reduce potential for hazardous material release into the river impacting the water supply of Valley City and others along the river. Include both railroad lines. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | New |
| Priority | Medium |
| Responsible Agency | Burlington Northern Santa Fe (BNSF) |
| Partners | Barnes County Commission, SWC |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | BNSF |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 3 | 3 | 2 | 1 | 3 | 5 | 22 |

Barnes County Project 30: Work with local, state, and federal entities to map community risk from hazards.

| | |
|--------------------------|--|
| Description/Benefit | Improve awareness of vulnerable areas and assets in the county and what hazards pose greatest risk. Increase usability of plan for local, state and federal entities and agencies. |
| Hazards Addressed | All |
| Affected Jurisdictions | Barnes County, Dazey, Fingal, Kathryn, Leal, Litchville, Nome, Oriska, Pillsbury, Rogers, Sanborn, Sibley, Valley City, Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Commission, Barnes County Emergency Manager |
| Partners | NDDDES, engineering firms, regional council, townships, highway departments, NDDOT, FEMA, city government, critical infrastructure owners, utility providers, SWC |
| Timeframe for Completion | 5 to 7 years |
| Cost | \$50,000 to \$150,000 |
| Funding Source | City, County, State and Federal Grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 2 | 4 | 5 | 3 | 5 | 28 |

Table 6.2 shows each mitigation project and the hazard or hazards it addresses. While some projects are specific to one or two hazards, others address all the hazards. Strategies aimed at reducing the effects of hazards on new and existing buildings and infrastructure are marked with an asterisk (*) next to the project number on the far left column in Table 6.2.

Table 6.2 – Mitigation Project Number and Hazard Addressed

| Incorporated Jurisdiction and Mitigation Project Number | Communicable Disease | Dam Failure | Drought | Flood | Geologic Hazard (Landslide) | Hazardous Material Release | Homeland Security Incident | Severe Summer Weather | Severe Winter Weather | Shortage of Critical Materials or Infrastructure | Transportation Accident | Urban Fire/Structure Collapse | Wildland Fire | Windstorm |
|---|----------------------|-------------|---------|-------|-----------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--|-------------------------|-------------------------------|---------------|-----------|
| <u>Barnes County</u> | | | | | | | | | | | | | | |
| Project 1* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 2 | | | X | | | | | | | | | X | X | |
| Project 3* | | | | | | | | | | X | | | | |
| Project 4 | X | | | | | | | | | | | | | |
| Project 5* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 6 | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 7 | | | X | X | | | | X | | | | | | |
| Project 8* | | | | | | | | | | | | X | X | |
| Project 9* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 10* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 11* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 12* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 13* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 14* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 15* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 16* | | | | X | X | | | | | | | | | |
| Project 17* | | | | X | X | | | | | | | | | |
| Project 18* | | | | X | | | | | | | | | | |
| Project 19* | | | | X | | | | | | | | | | |
| Project 20* | | | X | | | X | | | | | X | X | X | |
| Project 21* | | | | X | | X | X | X | X | | X | X | X | X |
| Project 22 | | | X | | | X | | | | | | | X | |
| Project 23 | | | | X | | | | X | X | X | | | | |
| Project 24* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 25* | | | | X | | | | X | X | | | | | |
| Project 26* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 27* | | | X | | | | | | | | | | | |
| Project 28* | | | | X | | | | X | X | | | | | X |
| Project 29* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 30* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |

Table 6.2 – Mitigation Project Number and Hazard Addressed - Continued

| Incorporated Jurisdiction and Mitigation Project Number | Communicable Disease | Dam Failure | Drought | Flood | Geologic Hazard (Landslide) | Hazardous Material Release | Homeland Security Incident | Severe Summer Weather | Severe Winter Weather | Shortage of Critical Materials or Infrastructure | Transportation Accident | Urban Fire/Structure Collapse | Wildland Fire | Windstorm |
|---|----------------------|-------------|---------|-------|-----------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--|-------------------------|-------------------------------|---------------|-----------|
| City of Dazey | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 3 | | | | | | | | X | | | | X | X | X |
| City of Fingal | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 3* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| City of Kathryn | | | | | | | | | | | | | | |
| Project 1* | | | | | | | | | | | | X | X | |
| Project 2* | X | | | X | | | | X | X | | | X | X | X |
| Project 3* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 4 | | | | | | | | X | | | | X | X | X |
| Project 5* | X | | X | X | X | | | X | X | X | | | | |
| City of Leal | | | | | | | | | | | | | | |
| Project 1* | X | | | X | | | | X | X | | | X | X | X |
| Project 2 | | | | | | | | X | | | | X | X | X |
| City of Litchville | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2* | X | | | X | | | | X | X | | | X | X | X |
| City of Nome | | | | | | | | | | | | | | |
| Project 1 | | | | | | | | X | | | | X | X | X |
| Project 2* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 3 | | | | X | | | | X | X | | | X | X | X |
| Project 4* | | | | | | | | X | X | | | | | X |
| City of Oriska | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 3 | | | | | | | | X | | | | X | X | X |
| Project 4* | X | | X | X | | | | X | X | | X | X | X | X |

Table 6.2 – Mitigation Project Number and Hazard Addressed - Continued

| Incorporated Jurisdiction and Mitigation Project Number | Communicable Disease | Dam Failure | Drought | Flood | Geologic Hazard (Landslide) | Hazardous Material Release | Homeland Security Incident | Severe Summer Weather | Severe Winter Weather | Shortage of Critical Materials or Infrastructure | Transportation Accident | Urban Fire/Structure Collapse | Wildland Fire | Windstorm |
|---|----------------------|-------------|---------|-------|-----------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--|-------------------------|-------------------------------|---------------|-----------|
| City of Pillsbury | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2 | | | | | | | | X | | | | X | X | X |
| Project 3 | | | | X | | | | X | X | | | X | X | X |
| City of Rogers | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2 | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 3 | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| City of Sanborn | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 3* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 4 | | | | X | | | | X | X | | | X | X | X |
| Project 5 | | | | | | | | X | X | | | | | X |
| City of Sibley | | | | | | | | | | | | | | |
| Project 1* | | | | | | | | | | | | X | X | |
| Project 2* | | | | X | | | | | | | | | | |
| Project 3* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 4 | | | | | | | | X | X | | | X | X | X |
| Project 5 | | | | X | | | | X | X | | | X | X | X |
| City of Valley City | | | | | | | | | | | | | | |
| Project 1* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 2* | | | | | | | | | | | | X | X | X |
| Project 3 | X | | | | | | | | | | | | | |
| Project 4* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 5* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 6* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 7* | | | | X | X | | | | | | | | | |
| Project 8* | | | | X | X | | | | | | | | | |
| Project 9* | | | | X | | | | | | | | | | |
| Project 10* | | | | X | | | | | | | | | | |
| Project 11* | | | | X | | | | | | | | | | |

Table 6.2 – Mitigation Project Number and Hazard Addressed - Continued

| Incorporated Jurisdiction and Mitigation Project Number | Communicable Disease | Dam Failure | Drought | Flood | Geologic Hazard (Landslide) | Hazardous Material Release | Homeland Security Incident | Severe Summer Weather | Severe Winter Weather | Shortage of Critical Materials or Infrastructure | Transportation Accident | Urban Fire/Structure Collapse | Wildland Fire | Windstorm |
|---|----------------------|-------------|---------|-------|-----------------------------|----------------------------|----------------------------|-----------------------|-----------------------|--|-------------------------|-------------------------------|---------------|-----------|
| City of Valley City | | | | | | | | | | | | | | |
| Project 12* | | | | X | | | | X | X | | | | | |
| Project 13* | | | | X | | | | X | X | | | | | |
| Project 14* | | | | | | | | | | | | X | X | |
| Project 15* | | | | X | | | | X | X | | | | | |
| Project 16 | X | | | | | | | | | | | | | |
| Project 17 | | | | X | | | | X | X | | | | | |
| Project 18 | X | | | X | | | | X | X | | | | | |
| | | | | | | | | | | | | | | |
| City of Wimbledon | | | | | | | | | | | | | | |
| Project 1* | X | | X | X | | | | X | X | | X | X | X | X |
| Project 2* | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Project 3 | | | | X | | | | X | X | | | X | X | X |

7. County/Jurisdiction Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory. The following definitions are provided for each capability category based on information from the Federal Emergency Management Agency. Table 7.1 highlights administrative and technical capabilities, Table 7.2 highlights education and outreach capabilities, Table 7.3 highlights financial capabilities and Table 7.4 shows additional planning and regulatory capabilities of each incorporated jurisdiction, including Barnes County. Table 7.5 lists state and federal sources for mitigation.

Boxes checked with an “X” indicate the jurisdiction possesses the capability; while boxes left blank indicate the jurisdiction is lacking the capability. Narratives following each table detail the capabilities of Barnes County. Information on the capabilities of each jurisdiction was gathered at jurisdictional meetings, committee meetings and interviews during the planning process. **Narratives detailing the capabilities of incorporated jurisdictions can be found in Chapter 8, Jurisdictions.**

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. A definition of each mitigation capability category is provided.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff and their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Table 7.1 shows the administrative and technical capabilities of Barnes County and incorporated jurisdictions. The fire ISO rating for each jurisdiction is listed in the table and discussed in the following narratives. Boxes marked with an “X” indicates the jurisdiction has or has access to the administrative or technical capability for mitigation. An asterisk (*) indicates a capability in progress.

Table 7.1 – Administrative and Technical Capabilities

| Administrative and Technical Mitigation Capability | Barnes Co. | Dazy | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbledon |
|--|------------|------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Chief Building Official/Inspector | | | | | | | | | | | | | X | |
| City Council/Commission | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Civil Engineer | | | X | | | | | | | | | | X | |
| Emergency Manager | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Emergency Services GIS Capable | X | X | | | | | | X | | | | | X | X |
| Emergency Siren | | X | X | X | X | X | X | X | | X | X | X | X | X |
| Fire Index Sign | | | | | | X | | | | | X | X | X | |
| Fire ISO Rating | | 9 | | 8 | | | | 9 | | 10 | 6 | 9 | 4 | 8 |
| Firewise Certification | | | | | | | | | | | | | | |
| Floodplain Administrator/Mngr. | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Generator (portable or permanent) | X | X | X | | | X | | | | | X | | X | X |
| Grant Writing Staff | X | X | X | | | X | | X | | | X | X | X | X |
| Infrastructure Maintenance Prgms. | X | | X | | X | | X | | X | | | X | X | X |
| LEPC | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Mutual Aid Agreements | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Other Staff for Administration | | X | | | | X | | X | | X | X | | X | |
| Planning Services | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Reporting of Data to Em. Mngr. | X | X | X | X | X | X | X | X | | X | X | X | X | X |
| StormReady Certification | | | | | | | | | | | | | | |

*Denotes communities that are in progress of purchasing and installing permanent generators.

Barnes County: Barnes County has an active county commission. The county does not have a chief building official or inspector. The county has a Local Emergency Planning Committee (LEPC). The county contracts with an engineering firm for civil engineering services. The Barnes County Emergency Manager is full-time and is also the floodplain administrator/manager. The county can contract with the South Central Dakota Regional Council (SCDRC), the regional planning council, or a private firm for planning services. The county road department maintains and repairs roads using chip-seal, and repairs and mows ditches on county roads. The county also is responsible for maintenance of all bridges located in the county, including bridges inside jurisdictional boundaries. The Barnes County Water Resource District is responsible for river channel maintenance and clearing of debris to eliminate snagging. The weed board conducts annual tree trimming and elimination of weeds. For grant writing and administration capabilities, the county has the emergency manager, city-county health director, social services, NDSU/Barnes County Extension Service and employees at the Barnes County Courthouse. The county can also contract with SCDRC for grant writing and administration. The county has a county-wide mutual aid agreement for all emergency services. The county also has regional and state aid for emergency services. The county maintains Code Red, which serves as an automated hazard notification system for phones. The county does not own fire index signs and does not have a fire ISO rating. The county does not have any emergency sirens. The county has two portable generators at the sheriff's department, but does not own permanent generators. The sign truck for the county road department and the truck for the county weed board have GPS for all vehicles. The Barnes County Sheriff's Department provides law enforcement services. Fire protection is provided by local fire districts/departments.

Ambulance service is provided by Barnes County Ambulance. Law enforcement, fire districts/departments and ambulance services report hazard data to the emergency manager. The county does not have Firewise Certification. The county is not StormReady Certified.

Table 7.2 shows the education and outreach capabilities of Barnes County and incorporated jurisdictions. Boxes marked with an “X” indicates the jurisdiction has or has access to the education and outreach capability for mitigation.

Table 7.2 – Education and Outreach Capabilities

| Education and Outreach Mitigation Capability | Barnes Co. | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbledon |
|--|------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| County/City Events | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Entities Providing Public Education | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Non-Profit Organizations | X | | | | | | | | | | | | X | |
| Other | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Public-Private Partnerships | X | | | | | | | | | | | | X | |
| School Programs | X | | | | | X | | X | | | | | X | |
| Website with Hazard Education | X | | | | | | | | | | | | X | |

Barnes County: The NDSU/Barnes County Extension Service, the Girl Scouts, the Boy Scouts, and the 4-H are organizations providing education and outreach on hazards. The county’s emergency management department maintains a website with hazard education information. The NDSU/Barnes County Extension Service, Central Valley Health District, and City-County Health provide public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. Eagle Creek Software Services and John Deere Seeding Group participate in the Community Emergency Response Teams (CERTS). The county’s emergency manager conducts education on shelter-in-place, response to sirens, 911 and general hazard education to students at public school and the general public, and provides brochures, pamphlets and other materials available at the Barnes County Courthouse.

Table 7.3 shows the financial capabilities of Barnes County and incorporated jurisdictions. Boxes marked with an “X” indicates the jurisdiction has or has access to the financial capability for mitigation.

Table 7.3 – Financial Capabilities

| Financial Mitigation Capability | Barnes Co. | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbledon |
|--|------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Building Permits | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Capital Improvements Fund | X | | X | X | | | X | | | | | | X | |
| Community Development Block Grant (CDBG) | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| General Obligation Bonds/Special Tax | | | X | X | | X | | | | | X | | X | |
| Other | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Private Entities | | | | X | | | | | | X | | | | |
| Sanitary Sewer Fee | | X | X | X | | X | X | | | | X | X | X | X |
| Special Assessments for New Development | X | | | | | | | | | | | | X | |
| Storm water Utility Fee | | | | | | | | | | | | | X | |

Barnes County: Barnes County sets aside tax revenue for capital improvements in a fund specifically for county roads and bridges and maintains a schedule of capital improvement projects. The county does not have storm water utility or sanitary sewer fees. The county does not levy special assessments for new development, but can do so if warranted. However, the Barnes County Water Resource District can levy special assessments for drainage improvements. The county may incur debt through general obligation bonds or special tax bonds but has not done so as of 2014. The county issues building permits. However, individual townships, if zoned, may require separate building permits. The county has access to Community Development Block Grants (CDBG) through the SCDRC. Between 1983 and 2012, CDBG funding was provided for 30 infrastructure projects in the county and 10 city jurisdictions. The Barnes County Rural Water District, Barnes County Water Resource District, townships, and county school districts are other sources of funding for mitigation. The townships may assess a fee or special assessment for infrastructure maintenance such as mowing roadside ditches or maintaining roads. State and federal sources can and have provided funding for mitigation.

In addition to the aforementioned financial capabilities of the county and city jurisdictions, the following local, regional, state and federal entities can be used as funding sources for mitigation.

- Barnes County Rural Water District
- Barnes County Water Resource District
- Bek Communications
- Cable Service, Inc. (CSI)
- Dakota Central Telecommunications (Daktel)
- Dakota Rural Water District
- Dickey Rural Networks (DRN)
- Federal Emergency Management Agency
- Inter-Community Telephone Company

- N.D. Department of Emergency Services
- Mid-Continent Communications
- Montana-Dakota Utilities
- Otter Tail Power Company
- Qwest

Table 7.4 shows the planning and regulatory capabilities of Barnes County and incorporated jurisdictions. Boxes marked with an “X” indicates the jurisdiction has or has access to the planning and regulatory capability. An asterisk (*) indicates a capability in progress.

Table 7.4 – Planning and Regulatory Capabilities

| Planning and Regulatory Mitigation Capability | Barnes Co. | Dazey | Fingal | Kathryn | Leal | Litchville | Nome | Oriska | Pillsbury | Rogers | Sanborn | Sibley | Valley City | Wimbledon |
|--|------------|-------|--------|---------|------|------------|------|--------|-----------|--------|---------|--------|-------------|-----------|
| Building Codes | | | X | X | X | | X | X | | | X | | X | |
| Building Permits | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Capital Improvements Plan | X | | | | | | | | | | | | X | |
| Community Wildfire Protection Program Plan | X | | | | | | | | | | | | | |
| Comprehensive Bank Stability & Restoration Study | X | | | | | | | | | | | | X | |
| Comprehensive Plan | | | | | | | | | | | | | X | |
| Continuity of Operations Plan | X | | | | | | | | | | | | | |
| Drought Management Plan | | | | | | | | | | | | X | | |
| Evacuation and Shelter Plan | X | | | | | | | | | | | | | |
| FEMA Flood Map | X | | | X | | X | | | | | | | X | |
| Flood Damage Reduction Study | | | | X | | | | | | | | | | |
| Flood Insurance Study | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Flood Management Plan | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Flood Risk Management Feasibility Report (USACE) | X | | | | | | | | | | | | X | |
| Flood Ordinance | X | | | | | | | * | | | | | X | |
| Impact Fees | | | | | | | | | | | | | X | |
| Pandemic Influenza Response Plan | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Inspector | | | | | | | | | | | | | X | |
| Land Use Plan | X | | | | | | | | | | | | X | |
| Local Emergency Operations Plan | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Planning Commission | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Shelter and Mass Care Plan | X | | | | | | | | | | | | | |
| Strategic Plan | | | | | | | | | | | | | X | |
| Storm Water Management Plan | X | * | | | | | | | | | | | X | |
| Subdivision Ordinance | X | | | | | | | | | | | | X | X |
| Transportation Plan | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Water Conservation Plan | | | | | | | | | | | | | X | |
| Zoning | X | | | X | X | | | | | | | X | X | X |

*Denotes communities that are in progress of implementing planning and regulatory mitigation capability.

Barnes County: Barnes County does not have a comprehensive, strategic, drought management or water conservation plan. The planning and zoning administration maintains a land use plan. The county road department has a capital improvements plan and maintains a schedule of projects. The county has a local emergency operations, but does not have a continuity of operations plan. The transportation plan is included in road department capital improvements plan. The county has a flood management plan, community wildfire protection program plan, evacuation and shelter plan, and a shelter and mass care plan administered by the county emergency manager. The flood management plan is also in the county's emergency operations plan. The county has a Flood Risk Management Feasibility and Environmental Assessment provided by the U.S. Army Corps. of Engineers and a Comprehensive Bank Stability and Restoration Study, which focuses on the city of Valley City. The county highway department, townships or individual cities are responsible for their own plans. The county has zoning that is current as of 2012. The planning and zoning administration acts as the planning commission. The county does not have building codes. The county does not have an inspector. The county is FEMA flood mapped as of 2007. The county does not have a flood damage reduction study, but does have a flood insurance study. The county has flood ordinances and subdivision ordinances, which are administered through the planning and zoning administration. The county does not have impact fees. The county issues building permits for building and development. The county also requires permits for septic systems, which is a code requirement. The cost of building permits is set up on a graduated scale based on building valuation. Central Valley Health and City-County Health also have a Pandemic Influenza Response Plan identifying points of dispensing sites in the county.

In addition to the aforementioned planning and regulatory capabilities of the county and city jurisdictions, strategic plans for townships can be used for mitigation purposes. However, as of 2014, there are no townships in Barnes County with adopted strategic plans.

In addition to strategic plans, townships that have zoning in place, including a zoning commission and a zoning administrator, can use zoning for mitigation purposes. In Barnes County, all townships follow the county's zoning. As of 2014, there are no townships in Barnes County with zoning in addition to the county's zoning. However, Eckelson Township has been discussing implementing additional zoning to address industrial development in Spiritwood Township in neighboring Stutsman County to the west.

Mitigation Funding Sources

Table 7.5 lists state and federal sources for mitigation. These sources have been identified to fund and administer mitigation projects in addition to the aforementioned local capabilities of the county and city jurisdictions.

Table 7.5 – State and Federal Mitigation Funding Sources

| Name | Managing Agencies |
|--|---|
| AmeriCorps | Corporation for National & Community Service |
| Community Development Block Grant (CDBG) | US Housing and Urban Development North Dakota Department of Commerce |
| Economic Development Administration (EDA) Grants and Investments | US Economic Development Administration |
| Emergency Watershed Protection | US Natural Resources Conservation Service |
| Environmental Quality Incentives Program | US Natural Resources Conservation Service |
| Flood Mitigation Assistance Program (FMA) | North Dakota State Water Commission and FEMA |
| Hazard Mitigation Grant Program (HMGP) | North Dakota Department of Emergency Services and FEMA |
| Hazardous Fuels Mitigation Program | North Dakota Department of Transportation |
| Homeland Security Grants | North Dakota Department of Emergency Services, US Department of Justice, US Department of Homeland Security |
| Individual Assistance (IA) | FEMA, North Dakota Department of Emergency Services |
| Map Modernization Program | North Dakota State Water Commission and FEMA |
| National Fire Plan (NFP) | North Dakota Forest Service and US Forest Service |
| NRCS Conservation Programs | U.S.D.A. Natural Resources Conservation Service |
| Pre-Disaster Mitigation (PDM) Grants | North Dakota Department of Emergency Services and FEMA |
| Public Assistance (PA) | North Dakota Department of Emergency Services and FEMA |
| Repetitive Flood Claims (RFC) Grant | North Dakota State Water Commission and FEMA |
| Rural Fire Assistance (RFA) Grant | National Interagency Fire Center |
| SBA Pre-Disaster Mitigation Loan Program | US Small Business Administration (SBA) |
| Severe Repetitive Loss (SRL) Grant | North Dakota State Water Commission and FEMA |
| Small Flood Control Projects | US Army Corps of Engineers (USACE) |
| Streambank & Shoreline Protection | US Army Corps of Engineers (USACE) |
| Wetland Program Development Grants (WPDGs) | US Environmental Protection Agency |

8. Jurisdictions

This chapter includes the profile and inventory, risk assessment, and hazard scoring notes for each hazard, mitigation project, and capabilities for mitigation for each incorporated city in Barnes County.

Comparative statistics of each jurisdiction in Barnes County is shown in Chapter 4, Profile and Inventory.

The incorporated cities are shown alphabetically.

8.1 City of Dazey

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.1.1, 8.1.2, 8.1.3, and 8.1.4. Figure 8.1.1 shows an aerial view of the city of Dazey with the city limits.

Figure 8.1.1 – City of Dazey



Source: Barnes County Emergency Management

8.1.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Dazey. Detailed narratives follow each section heading to profile the city. Additional information on the city of Dazey and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Dazey is located on N.D. State Highway 1, approximately 30 miles north-northwest of Valley City in Barnes County.

Population

The population is 104 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Dazey consists of 28 individuals under the age of 20, and 10 individuals over the age of 65, representing 26.9 percent and 9.6 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 52 housing units in the city consisting of 45 single-family homes, eight multifamily homes, and no mobile homes.

Services Provided

The city of Dazey obtains potable water from Barnes Rural Water District. The city maintains a well for fire protection. There are no septic systems in city limits. The city has a sanitary sewer system and a lagoon with two cells. The city does not have a storm water system. The city has a lift station for the sanitary sewer system. Sanitation Specialists provides garbage services. The city does not maintain an inert landfill. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

Publicly owned buildings in the city of Dazey has a post office, county shop, park, and community center. The park contains playground equipment, basketball and tennis courts, picnic shelter, and baseball field. The community center serves as the official storm shelter and city hall. The city does not have a city shop, library, armory, swimming pool, school, airport or golf course. There are no state government buildings in the city. There are 45 single-family homes, eight multifamily units and no mobile homes in the city of Dazey as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Dazey Fire Department provides protection to the city and the Dazey Fire District provides fire protection to surrounding rural areas. The Dazey Quick Response Unit has two EMTs and

four first responders. The city has a fire hall. First responders are based in the fire hall. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. The city maintains a well. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Dazey. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.1.2 Risk Assessment and Hazard Scoring Notes

Table 8.1.2 summarizes the risk assessment scoring of the city of Dazey. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.1.2.

Table 8.1.2 – City of Dazey Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Dazey | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 3 | 3 | 2 | 8 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 2 | 2 | 3 | 2 | 9 |
| Flood | 4 | 4 | 4 | 4 | 2 | 14 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 3 | 3 | 1 | 11 |
| Homeland Security Incident | 3 | 1 | 2 | 3 | 1 | 8 |
| Severe Summer Weather | 3 | 2 | 3 | 3 | 2 | 9 |
| Severe Winter Weather | 4 | 4 | 4 | 4 | 2 | 14 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 4 | 3 | 2 | 10 |
| Transportation Accident | 3 | 2 | 3 | 2 | 2 | 8 |
| Urban Fire/Structure Collapse | 3 | 2 | 2 | 3 | 2 | 8 |
| Wildland Fire | 4 | 3 | 3 | 4 | 2 | 12 |
| Windstorm | 3 | 3 | 3 | 2 | 2 | 9 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • No real loss of economy • Some people get sick each year |
| Frequency | 2 | <ul style="list-style-type: none"> • Some people get sick each year, some crop and livestock loss |
| Likelihood | 3 | <ul style="list-style-type: none"> • Due to standing water possible increase in the West Nile virus cases and mosquito problems • Abandoned properties and overgrown lawns |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 28 people under the age of 20 and 10 people over the age of 65 in the city representing 26.9 percent and 9.6 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Half of residents do not have health insurance • More vulnerable: High senior population but no school • More vulnerable: Day care with six to eight kids each day • More vulnerable: Abandoned properties and overgrown lawns |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic or hospital • Has quick response unit • Barnes County Ambulance • Internet connections, TV, etc. |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Dazey.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy • Higher cost to cool homes, increased utilities |
| Frequency | 2 | <ul style="list-style-type: none"> • Some dry conditions each year, couple weeks in length • In 2013, dry conditions for July and August, little to no rain |
| Likelihood | 2 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable • Not a lot of drain tile in the area thus far |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: High senior population • More vulnerable: Abandoned buildings may result in fires • More vulnerable: No crop break around the city • Less vulnerable with no school |
| Capability | 2 | <ul style="list-style-type: none"> • 25,000 gallon storage tank at the park, underground • Dazey fire department has pumper tanker, brush rigs, water moving equipment, all carry water and area always full |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Water accumulates in city park and throughout the city • Impacts the lift station, losses power, people experience sewer backups • Blocked roads in the city • Basement flooding occurs • No death or injuries • Long-term health risks due to mold and disease from standing water • Mosquito infestation, nuisance |
| Frequency | 4 | <ul style="list-style-type: none"> • Standing water each year in the city park • Basements have seepage yearly |
| Likelihood | 4 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Fill in the drainage ditch, water does not have anywhere to drain • City located in a closed basin • Drainage of farmland may increase likelihood |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Abandoned buildings • More vulnerable: High elderly population • More vulnerable: City park-low lying spot in the city • More vulnerable: Daycare located near slough • More vulnerable: Inadequate storm water system-old and cannot serve the community • More vulnerable: Lift station is located adjacent to where water accumulates • More vulnerable: Pump house in the park, affect drinking water • Less vulnerable: No school |
| Capability | 2 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • Fire department has equipment to pump water, somewhat effective. • City has floating pump. • Has borrowed pumping equipment from Hannaford and Barnes County Fire Dept. • Barnes Rural Water Board and Water District |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Dazey.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation |
| Frequency | 2 | <ul style="list-style-type: none"> • Some tanks have overfilled and released from heat in the summer |
| Likelihood | 3 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • More chemicals being stored in the area by farmers on their properties |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No communication or way to spread the word if something happened. • More vulnerable: People are not signed up for Code Red • More vulnerable: Lack of street signs, road safety, no planned improvements • More vulnerable: Truck traffic carrying chemicals on N.D. Highway 1 • More vulnerable: Long response from Ambulance |
| Capability | 1 | <ul style="list-style-type: none"> • No stockpile of medical • Quick response unit • Covered by Barnes County Ambulance |

Homeland Security Incident

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.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss population |
| Frequency | 1 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 2 | <ul style="list-style-type: none"> • Local resident is mentally ill and chemically dependent |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Day care in city limits • More vulnerable: Local resident is unstable |
| Capability | 1 | <ul style="list-style-type: none"> • Sheriff’s department • Fire department |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|---------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Overland flooding in city park from heavy rains • Hail damage to homes, loss of power, fallen trees and debris • Lighting strike could cause a fire to buildings • Abandoned buildings could collapse, blown over • Loss of life and injury |
|---------------|---|---|

| | | |
|----------------------|---|--|
| Frequency | 2 | <ul style="list-style-type: none"> • Heavy rain from time to time • Little lightning or hail |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of storm water drain • Heavier rains in recent years, more intense rain |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 28 people under the age of 10 and 10 people over the age of 65 in the city representing 26.9 percent and 9.6 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Has storm siren, but not adequate. Manually started. Dispatch cannot set siren off. • More vulnerable: Temporary worker population-Mayo construction • More vulnerable: No official emergency shelter • More vulnerable: Senior population, day care • More vulnerable: Roads can become blocked-heavy rains • More vulnerable: Limit access for emergency services • Less vulnerable: No mobile homes |
| Capability | 2 | <ul style="list-style-type: none"> • Has inert landfill for debris • City has a tractor to move debris • Has community center for people to take cover • Fire department has equipment |

Severe Winter Weather

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

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources |
| Frequency | 4 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future • Removal of shelter belts and vegetation leads to more ground blizzard conditions |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are 28 people under the age of 10 and 10 people over the age of 65 in the city representing 26.9 percent and 9.6 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Day care • More vulnerable: Abandoned buildings • More vulnerable: One major highway for transportation, three access points into the city • More vulnerable: Use of propane-low temperature will affect it • Less vulnerable: No mobile homes |
| Capability | 2 | <ul style="list-style-type: none"> • City has tractor with snow scoop • City has a snow blower • Alternative heating sources-propane |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time could lead to loss of life • Power outages-lasts very short • Senior population impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water, limited sanitary sewer • Costly to the city to take care of the issue |
| Frequency | 2 | <ul style="list-style-type: none"> • In 1997, lost power for 3 days • Intermittent, 2 to 3 times per month during the summer. One a month or so in the winter • Some blocked roads during winter months up to a day, couple times during the season |
| Likelihood | 4 | <ul style="list-style-type: none"> • Water service set up, when power goes out, turn off valves and allow rural water system to deliver water. Reduced pressure instead • Roads become blocked and are difficult to maintain. Local resident has tractor to clear roads. • Relies on highway department for N.D. Highway 1, city streets are on the last part of the list. • No backup power for lift station |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: One power connection from Otter Tail • More vulnerable: No grocery • More vulnerable: Some people grow local food supply • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues • More vulnerable: No gas station |
| Capability | 2 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • Resident has portable generator • Fire department has 4 portable generators • Small size of community: people willing to help out, come together |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|-------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Highway 1 can become blocked limiting access • Loss of property such as cars, trucks, etc. • Result in HAZMAT |
| Frequency | 2 | <ul style="list-style-type: none"> • Nothing major in the area in recent years • ATV accidents in the country side, fire dept. responded |
| Likelihood | 3 | <ul style="list-style-type: none"> • Increase in truck traffic on Highway 1 • Recreational vehicles are used |

| | | |
|----------------------|---|--|
| Vulnerability | 2 | <ul style="list-style-type: none"> • No railroad, no airport • Farmer has private landing strip • More vulnerable: No local ambulance, response times from Barnes More vulnerable: County prolonged. • No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Senior population doesn't drive much • More vulnerable: Highway does not enter city limits • Less vulnerable: No railroad, no airport • Less vulnerable: Farmer has private landing strip |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic • Quick response unit, fire department has equipment • People have large trucks, tractors, equipment-farmers mostly |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings |
| Frequency | 2 | <ul style="list-style-type: none"> • No real incident in recent years • House on fire early 1990s • Responded to tractor fire in Sibley, week of June 2, 2014 |
| Likelihood | 2 | <ul style="list-style-type: none"> • Presence of abandoned buildings and absentee owners, deteriorating, more susceptible to fire |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Senior population, day care. • More vulnerable: Abandoned properties are vulnerable areas. Around 7 properties/buildings. • More vulnerable: Chemically dependent/mentally unstable individual • More vulnerable: Lack of alternative housing |
| Capability | 2 | <ul style="list-style-type: none"> • Fire department, fire hall, 4 fire trucks in town • Underground storage tank for backup water for fire suppression • Lack of building codes and enforcement • 6 dedicated personnel for fire department |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|-------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy and structures • Loss of farm equipment, structures • Could result in HAZMAT • Health hazard due to poor air quality |
| Frequency | 3 | <ul style="list-style-type: none"> • Farmers do controlled burns with 50% becoming out of control |
| Likelihood | 3 | <ul style="list-style-type: none"> • Continue to have controlled burns |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Lack of fire break around the city • Dry conditions each year for a couple weeks. Strong winds. |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Lack of crop break around the city • More vulnerable: Lack of manpower • More vulnerable: Windy conditions each year |
| Capability | 2 | <ul style="list-style-type: none"> • Fire department, fire hall, 4 fire trucks in town • Underground storage tank for backup water for fire suppression • Lack of building codes and enforcement • 6 dedicated personnel for fire department • Mutual aid agreements with Wimbledon, Sanborn, Hannaford, Rogers |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Trees toppled and uprooted. • Abandoned buildings could topple. Grain bin collapsed. • Loss of life, injury • Storm sewer could lose power from flying debris-loss of sewer system • Power outage |
| Frequency | 3 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions |
| Likelihood | 3 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Abandoned structures • More vulnerable: Power lines • More vulnerable: Lift station vulnerable to power outages • Less vulnerable: No mobile homes |
| Capability | 2 | <ul style="list-style-type: none"> • Lack of building codes • Fire department with equipment • City has a tractor • Inert landfill |

8.1.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Dazey.

Problem Statement

Located in a closed basin, the city of Dazey experiences overland flooding causing damage to property, critical facilities, and infrastructure. The city lacks generators for backup power and the emergency siren is manually activated. With little to no capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of generators and an upgraded emergency siren are a priority for the city.

City of Dazey Project 1: Establish permanent drainage from the city park to the slough east of the city to eliminate occurrences of overland flooding.

| | |
|--------------------------|--|
| Description/Benefit | Reduction of damage to critical facilities and infrastructure from annual flooding to assure access for emergency services and continued operation of public infrastructure. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Dazey |
| Project Status | Continue |
| Priority | High |
| Responsible Agency | Dazey City Council, Barnes County Emergency Manager Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 3 | 3 | 5 | 1 | 27 |

City of Dazey Project 2: Install generators for the city lift station and pump house.

| | |
|--------------------------|--|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system and pump house for drinking water. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Dazey |
| Project Status | New |
| Priority | High |
| Responsible Agency | Dazey City Council, Barnes County Emergency Manager |
| Partners | Jurisdictional officials, emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Dazey Project 3: Install upgraded warning system.

| | |
|--------------------------|--|
| Description/Benefit | Install updated warning siren replacing manually-activated siren with county-dispatch-activated sirens. The siren provides warning for people to take shelter from approaching storms. |
| Hazards Addressed | Fire, Severe Summer Weather, Windstorm |
| Affected Jurisdictions | City of Dazey |
| Project Status | New |
| Priority | High |
| Responsible Agency | Dazey City Council, Barnes County Emergency Manager |
| Partners | Barnes County Commission, fire departments and districts |
| Timeframe for Completion | 1 to 3 years |
| Cost | \$7,500 per siren |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

8.1.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Dazey with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Dazey.

The city of Dazey has an active city council. The city does not have a chief building official or inspector. The city has an LEPC through the county. The city does not have a civil engineer on staff, but does have the option to contract for engineering services when needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services. The city conducts infrastructure maintenance on an as-needed basis. The city council has grant writing capability. The fire district/department staff have administration capabilities for mitigation. In addition to the county-wide mutual aid agreement, the city has mutual aid for emergency services with Rogers, Sanborn and Wimbledon, and Hannaford in neighboring Griggs County. The city has an emergency siren located on top of the community center, but it is not adequate as it is manually activated. The fire district/department has four portable generators for backup power, but does not have any permanent generators. The fire ISO rating is nine. The city does not have a fire index sign. The fire district/department does not have GIS capabilities, but staff have smart phones with location and mapping applications. The mayor and fire district/department chief reports hazard data to the emergency manager. The city does not have Firewise or StormReady Certification.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Dazey.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. The city does not have any entities providing public education on hazards, but has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Dazey.

The city does not set aside tax revenue for capital improvements, but does maintain a savings account. The city does not have storm water utility fee as it lacks a storm water system. The city does special assess \$10 per month for maintenance of the sanitary sewer system. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits through the county. The city has access to CDBG funds through the

SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Dazey.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. However, the city is in progress of developing a storm water management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning, subdivision ordinances or impact fees. The city issues building permits through the county. The city council serves as the planning commission for the city. The city has not adopted building codes and does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

Plain Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.2 City of Fingal

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.2.1, 8.2.2, 8.2.3, and 8.2.4. Figure 8.2.1 shows an aerial view of the city of Fingal with the city limits.

Figure 8.2.1 – City of Fingal



Source: Barnes County Emergency Management

8.2.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Fingal. Detailed narratives follow each section heading to profile the city. Additional information on the city of Fingal and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Fingal is located on N.D. State Highway 32, approximately 22 miles south-southeast of Valley City in Barnes County.

Population

The population is 97 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Fingal consists of 30 individuals under the age of 20, and 15 individuals over the age of 65, representing 30.9 percent and 15.5 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 63 housing units in the city consisting of 47 single-family homes, 13 multifamily homes, and three mobile homes.

Services Provided

The city of Fingal obtains potable water from Barnes Rural Water District. There are no septic systems used by city residents. The city has a sanitary sewer system and a lagoon. The city does not have a storm water system. The city has a lift station for the sanitary sewer system located behind the community center. Fraedrich Transport provides sanitation services. The city does not maintain an inert landfill. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Fingal maintains a city hall/community center, but does not have a county or city shop, library, armory, swimming pool, airport or golf course. The city has a post office and city shop. The city once had a K-12 school, which closed in 2000. The city maintains a park with playground equipment. The Holy Trinity Catholic Church serves as the official storm shelter. There are no county or state government buildings in the city. There are 47 single-family homes, 13 multifamily units and three mobile homes in the city of Fingal as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Fingal Voluntary Fire Department and District provides fire protection to the city and has

a fire hall. There are four first responders in the city and are based in the fire hall. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Fingal. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provided in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.2.2 Risk Assessment and Hazard Scoring Notes

Table 8.2.2 summarizes the risk assessment scoring of the city of Fingal. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.2.2.

Table 8.2.2 – City of Fingal Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Fingal | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 2 | 4 | 1 | 9 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 3 | 3 | 3 | 1 | 12 |
| Flood | 3 | 3 | 3 | 4 | 1 | 12 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 3 | 4 | 4 | 1 | 14 |
| Homeland Security Incident | 4 | 2 | 3 | 3 | 1 | 11 |
| Severe Summer Weather | 4 | 3 | 3 | 3 | 1 | 12 |
| Severe Winter Weather | 4 | 4 | 4 | 4 | 1 | 15 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 3 | 3 | 1 | 10 |
| Transportation Accident | 4 | 3 | 4 | 4 | 1 | 14 |
| Urban Fire/Structure Collapse | 3 | 3 | 3 | 4 | 1 | 12 |
| Wildland Fire | 3 | 3 | 3 | 3 | 1 | 11 |
| Windstorm | 4 | 3 | 3 | 4 | 1 | 13 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock. • Some people get sick each year, possible death • Crop or animal losses would impact local economy |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 2 | <ul style="list-style-type: none"> • Proper mowing of city lots and vegetation • Abandoned houses • Rodents are present in local structures |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are 30 people under the age of 20 and 15 people over the age of 65 in the city representing 30.9 percent and 15.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Some houses have overgrown vegetation • More vulnerable: House near Lutheran church has lots of vegetation • More vulnerable: Rodents living in some buildings, skunks, wildlife • More vulnerable: Skunk population is growing • More vulnerable: No clinic or hospital, no ambulance • Less vulnerable: Internet connections, TV, etc. • Less vulnerable: Low elderly population |
| Capability | 1 | <ul style="list-style-type: none"> • No clinic or hospital, no ambulance • Internet connections, TV, etc. • No stockpile of medical supplies • First responders have supplies • No education programs or outreach • Limited financial capabilities • Active city council • No plans in place |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Fingal.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|---------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs, casualties (possible) • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Lower water supplies/water shortages |
|---------------|---|---|

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Impacts local food supplies • Agriculture based economy |
| Frequency | 3 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length • In 2013, dry conditions for June to October - little to no rain |
| Likelihood | 3 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable • Not a lot of drain tile in the area • No over irrigation |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Agriculture economy, not diversified • More vulnerable: No backup tanks or tower • Less vulnerable: Low elderly population • Less vulnerable: City connected to Barnes Rural Water • Less vulnerable: People (some) preserve rain water, uses river and creek as well |
| Capability | 1 | <ul style="list-style-type: none"> • No education programs or outreach • Limited financial capabilities • Active city council • Barnes Rural Water District • No plans |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads in the city • Increased mosquitos-many transmit disease due to lots of grass and debris laying around • Basement have become flooded • Residents have sump pumps running 24/7 • Large property loss, vehicles, personal property • Some casualties |
| Frequency | 3 | <ul style="list-style-type: none"> • Only happens when a lot of precipitation or snow in the winter • Depends largely on the weather • Sump pumps are constantly running from high water table • Couple times per year |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Runoff from farms from the west, coulees north of town • Due to lack of storm water system, is likely in the future • High water table • Planting method of beans, changing in farm practices causes water to run off, no longer ridged • Drainage ditches are dug to drain agriculture fields |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: Low elderly population • More vulnerable: Location of lift station not elevated • More vulnerable: Water from surrounding farms |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Loss of power from flooding causes sanitary system to backup • More vulnerable: Main Street and 4th avenue experience overland flooding • More vulnerable: Lift station located in lowest part of the city |
| Capability | 1 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council • Barnes Rural Water District • No plans |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Fingal.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility • Railroad out of service when elevator burned down, worried about heat from tracks |
| Frequency | 3 | <ul style="list-style-type: none"> • Never had any major occurrences |
| Likelihood | 4 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating. • Trucks transporting larger tanks, carrying more chemicals • Truck route around the city – little use • No anhydrous tanks or chemicals – decreases likelihood, no chemicals at all • Increase in train traffic, carrying oil, chemicals |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area • More vulnerable: Small size-would impact all areas of the city • More vulnerable: Lack grade-separated crossings with railroad • More vulnerable: Increase in oil and chemical traffic on railroad • More vulnerable: City located off Highway 32, trucks do not traverse through the city • Less vulnerable: No chemicals stored in the city • Less vulnerable: Low elderly population |
| Capability | 1 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • No education programs or outreach |

| | | |
|--|--|--|
| | | <ul style="list-style-type: none"> • Limited financial capabilities • Active city council • Barnes Rural Water District • No plans People are signed up for Code Red – whole town is signed up • Covered by Barnes County Ambulance. • First responder & EMT |
|--|--|--|

Homeland Security Incident

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.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss population |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 3 | <ul style="list-style-type: none"> • No major employers • No school in the city • No dense or large population in the area • Increase in train traffic may increase likelihood |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Trains traversing through town • Less vulnerable: Right off a highway - evacuation route |
| Capability | 1 | <ul style="list-style-type: none"> • Community hall and fire hall for gathering of residents • Sheriff’s department – Barnes • First responder & EMT • No real plans in place or financial tax base • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council • Barnes Rural Water District |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|---------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Property damage to community buildings • Lighting strike could cause a fire to buildings • Loss of life, injury • Cars become stalled • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings • Lightning strike to power pole and trees. Power outages can occur • Possible displacement of an estimated five people based on an average household size of 1.5 people and three mobile home structures |
|---------------|---|---|

| | | |
|----------------------|---|---|
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain from time to time during summer months • Couple high winds and strong storms per summer season • Climate trends |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of storm water drain and storm water • Not a lot of heavy rains in recent years |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 30 people under the age of 20 and 15 people over the age of 65 in the city representing 30.9 percent and 15.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Roads can become blocked-heavy rains, trees, blown debris. • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower • More vulnerable: Vulnerable populations • More vulnerable: Three trailer homes • More vulnerable: Abandoned buildings, not well kept, could collapse from heavy rain or wind • Less vulnerable: Roads in and out of town are well maintained – good access |
| Capability | 1 | <ul style="list-style-type: none"> • No inert landfill for debris • Fire department has equipment • Have adopted state building codes – lack enforcement • First responder & EMT • Fire hall, community hall • Small tax base • Active city council • No real plans in place or financial tax base • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council • Barnes Rural Water District |

Severe Winter Weather

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

| | | |
|---------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Severe low temperatures-increase utility costs • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal if we have heavy snow • Highways can become icy reducing mobility speeds • Heavy rain results in melting and potential flooding in the spring |
|---------------|---|--|

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Barnes County experiences delays in opening roads due to staff reductions • Possible displacement of an estimated five people based on an average household size of 1.5 people and three mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area • High winds and ground blizzard conditions |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future due to our climate • Removal of shelter belts and vegetation leads to more ground blizzard conditions |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are 30 people under the age of 20 and 15 people over the age of 65 in the city representing 30.9 percent and 15.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Lack of paved streets • More vulnerable: Can block the access to town/block roads • More vulnerable: North entrance from Highway 32 is blocked more frequently than others • Less vulnerable: Good city shop located in the city with snow blower, other equipment |
| Capability | 1 | <ul style="list-style-type: none"> • Have adopted state building codes – lack enforcement • First responder & EMT • Fire hall, community hall • Small tax base • Active city council • No real plans in place or financial tax base • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council • Barnes Rural Water District |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages loss of economy • Elderly individual impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water, limited-sanitary sewer • Costly to the city to take care of the issue, financial burden |
| Frequency | 2 | <ul style="list-style-type: none"> • Power outages-not long lasting, mostly momentary, up to 2 or 3 hours • More during the summer from thunderstorms and falling tree branches • Never an issue with water • Never any issues with food, people stock up |

| | | |
|----------------------|---|--|
| Likelihood | 3 | <ul style="list-style-type: none"> • County clears roads-does real well • Some residents has their own generator • City has portable generator • City has snow blower to clear roads • Clearing of street is done by local residents to a point • Burying of lines by Otter Tail, or stronger posts have reduced power outages • Loss of area needing electrical service increases reliability |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No grocery • More vulnerable: No gas station • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues • More vulnerable: Elderly or young population and getting medication (vulnerable) • More vulnerable: Some residents lack backup power supplies for heating purposes • Less vulnerable: Some people grow local food supply – few |
| Capability | 1 | <ul style="list-style-type: none"> • No real plans in place or financial tax base • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council • Barnes Rural Water District |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles • Explosions from oil trains |
| Frequency | 3 | <ul style="list-style-type: none"> • Nothing major in the area in recent years • 10 years ago, heavy fog caused a motorist to hit a train on Highway 32 |
| Likelihood | 4 | <ul style="list-style-type: none"> • Frequently patrolled by county sheriff - decreases speeding & likelihood • Truck route • Heavy smoke from controlled burning reduces visibility • Increase in oil train traffic • Increase in truck traffic on Highway 32 • Layout of entrances into town with bad visibility and signage |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Lack of paved streets-soggy roads, pot holes • More vulnerable: Vulnerable populations |

| | | |
|-------------------|---|---|
| | | <ul style="list-style-type: none"> • More vulnerable: Increase in truck and train traffic on rail line and highway 32 • More vulnerable: Layout of streets off main street and railroad confusing and may cause a few accidents • Less vulnerable: No airport • Less vulnerable: Sheriff is good at patrolling county 32 |
| Capability | 1 | <ul style="list-style-type: none"> • First responder & EMT • Fire hall, community hall • Small tax base • Active city council • No real plans in place or financial tax base • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council • Barnes Rural Water District |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings |
| Frequency | 3 | <ul style="list-style-type: none"> • No real incidents • Dome/Trailer house burned down spring 2014 • Single-family home abandoned experienced fire damage in 2007 |
| Likelihood | 3 | <ul style="list-style-type: none"> • Abandoned buildings, not well kept • Vegetation can become dry from drought and cause a building to fire, mostly down on large lot with debris • Existing hydrants, but are not maintained by Barnes Rural Water • Outdated electrical in homes • Wood burners used in some residences |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing-residents will take them in however. • No more CRP near the city except for SW part of the city • Connected to Rural Water • More vulnerable: Distance from neighboring fire departments can lead to more issues, bigger impact, etc. • More vulnerable: Small size of town and spacing of residential structures reduces risk, however buildings on main street are close together and hazardous • More vulnerable: Abandoned buildings not well kept • More vulnerable: Bradley house on northwest corner of town is vulnerable from being abandoned • More vulnerable: Existence of hydrants does not lower vulnerability due to poor water pressure |

| | | |
|-------------------|---|---|
| | | <ul style="list-style-type: none"> • Less vulnerable: No more CRP near the city except for SW part of the city • Less vulnerable: Connected to rural water |
| Capability | 1 | <ul style="list-style-type: none"> • Fire department with truck and equipment • Adopted state building codes • First responder & EMT • Mutual aid with county • Small tax base • Active city council • No real plans in place or financial tax base • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 3 | <ul style="list-style-type: none"> • Farmers do controlled burning, can become out of control at times • No reports of lightning impacting |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of fire break around the city • Hot bearings from trains causing vegetation to ignite • Dry conditions each year for a couple weeks, strong winds • No more CRP, except for southwest side of city • Grassland surrounds the city • Existence of hydrants does not lower vulnerable due to poor water pressure |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of manpower. Prolonged response from surrounding fire districts • More vulnerable: Windy conditions each year • More vulnerable: Trailer homes • More vulnerable: Lack of fire break • More vulnerable: No CRP except for southwest side of city • More vulnerable: Residents do not maintain individual wells and sources of water • More vulnerable: Existence of hydrants does not lower vulnerable due to poor water pressure • More vulnerable: Lots of grass and vegetation in the area all sides of city • More vulnerable: Overgrown lots in city limits |
| Capability | 1 | <ul style="list-style-type: none"> • Adopted state building codes |

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • Mutual aid with Nome and Litchville, Fingal, Fort Ransom • Small man power • Fire department with equipment-four trucks, Fire Hall • First responder & EMT |
|--|--|---|

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Toppled trees, uprooted • Loss of life, injury • Loss of crop and livestock • Loss of power • Could start a fire of buildings and structures, could allow grass fire to spread • Possible displacement of an estimated five people based on an average household size of 1.5 people and three mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Straight line winds mostly in summer months, tree debris • In 2003/2004, lots of damage from wind to homes and trees, airborne debris, branches |
| Likelihood | 3 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly • Cyclical weather patterns could increase or decrease • Lack of buildings on west side of city-wind has direct access into town • Location in lower part of the surrounding area • Removal of shelter belts |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are 30 people under the age of 20 and 15 people over the age of 65 in the city representing 30.9 percent and 15.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Power lines in town not buried • More vulnerable: Lack of redundancy in power grid • More vulnerable: Removal of shelter belts • Less vulnerable: Community center/catholic church for a shelter |
| Capability | 1 | <ul style="list-style-type: none"> • Fire department with truck and equipment • Adopted state building codes • First responder & EMT • Mutual aid with county • Small tax base • Active city council • No real plans in place or financial tax base • Lack of manpower by the city and general public • No education programs or outreach • Limited financial capabilities • Active city council |

8.2.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Fingal.

Problem Statement

The city of Fingal experiences overland flooding on Main Street/4th Avenue due to poor drainage. Changes in agriculture practices of surrounding farmland has increased runoff causing additional flooding issues in the city. Critical facilities and infrastructure are vulnerable to flooding. Transportation accidents are another issue as the city has seen an increase in truck and rail traffic. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of backup power sources, and improvements to transportation systems are a priority for the city.

City of Fingal Project 1: Create and implement drainage ditch maintenance system for drain at County Road 34 and 1st Avenue near railroad crossing.

| | |
|--------------------------|---|
| Description/Benefit | Maintain flow of runoff to eliminate standing water blocking roads to maintain access for city residents and emergency services and continued operation of public infrastructure. Control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Fingal |
| Project Status | New |
| Priority | Medium |
| Responsible Agency | Fingal City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 3 | 3 | 5 | 5 | 31 |

City of Fingal Project 2: Install permanent generators for lift station and community center.

| | |
|--------------------------|--|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system and assure resiliency of community center as a storm shelter. Replace portable generator for lift station. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Fingal |
| Project Status | Continue |
| Priority | High |
| Responsible Agency | Fingal City Council, Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Fingal Project 3: Grade separate roads and highways from railroad crossings and/or install crossing arms.

| | |
|--------------------------|---|
| Description/Benefit | Maintain access for emergency services and assure county-wide communication of accessibility. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Fingal |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Highway Department Superintendent, Binghampton Township Board |
| Partners | County, emergency agencies (ambulance, fire, police) engineering firms, soil conservation, |
| Timeframe for Completion | 10 to 20 years |
| Cost | Project specific |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 2 | 3 | 3 | 3 | 5 | 25 |

8.2.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Fingal with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Fingal.

The city of Fingal has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer on staff, but contracts with a private firm for infrastructure maintenance. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services. The city maintains a contract with a sewer superintendent from Fargo to maintain the lift station on an annual basis. The city owns a mower and mows city property and vacant lots. The city charges \$50 per lot per mowing instance with charges placed on the water/sewer bill. The city auditor has grant writing capability. The city can also rely on the county emergency manager or the SCDRC for grant writing and administration. Mutual aid for emergency services is provided through the county-wide agreement. The city has an emergency siren located on the roof of the fire hall. The city has a portable generator for the lift station behind the community center. The portable generator is stored in the bus barn. The city does not have any permanent generators for backup power. The ISO rating for the city is unknown. The city does not have a fire index sign. Emergency services are not GIS capable. The fire chief reports hazard data to the emergency manager. It is unknown if the city is Firewise or StormReady Certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Fingal.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. The city does not have any entities providing public education on hazards, but has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. However, the all school reunion held in the city provides an opportunity for hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Fingal.

The city maintains a general fund and sets aside additional revenue in a separate account specifically for sewer projects. The city does not have storm water utility fee as it lacks a storm water system. The city does special assess \$7.75 per month on the garbage and sewer bill for maintenance of the sanitary sewer system. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city incurred debt through a bond from the state for a recent sewer project. The city can incur debt through general obligation bonds or special tax bonds in the future if needed. The city issues building permits. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Fingal.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning in place, but considers development on a case-by-case basis. The city does not have subdivision ordinances or impact fees, but does issue building permits. The city council serves as the planning commission for the city. The city adopted state building codes, but does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.3 City of Kathryn

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.3.1, 8.3.2, 8.3.3, and 8.3.4. Figure 8.3.1 shows an aerial view of the city of Kathryn with the city limits.

Figure 8.3.1 – City of Kathryn



Source: Barnes County Emergency Management

8.3.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Kathryn. Detailed narratives follow each section heading to profile the city. Additional information on the city of Kathryn and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Kathryn is located on Barnes County Highway 21, approximately 18 miles south of Valley City in Barnes County.

Population

The population is 52 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Kathryn consists of eight individuals under the age of 20, and 23 individuals over the age of 65, representing 15.4 percent and 44.2 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 39 housing units in the city consisting of 37 single-family homes, no multifamily homes, and two mobile homes.

Services Provided

The city of Kathryn obtains potable water from a city well and a reservoir fed by a natural spring. There are no septic systems in city limits. The city has a sanitary sewer system and a lagoon. The city does not have a storm water system. The city has a lift station for the sanitary sewer system located on the east side of town on 2nd Avenue. Fraedrich Transport provides garbage services. The city does not maintain an inert landfill. The official newspaper is the Litchville Bulletin.

Jurisdictional Buildings

The city of Kathryn maintains a city hall/community center, but does not have a city shop, library, armory, swimming pool, airport or golf course. The city has a post office and county shop. The city maintains a park with playground equipment, a picnic area and basketball court. The fire hall serves as the storm shelter. The city does not have a school. There are no state government buildings in the city. There are 37 single-family homes, no multifamily units, and two mobile homes in the city of Kathryn as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Kathryn Fire Department provides fire protection to the city and the Oak Hill Fire District provides fire protection to areas surrounding the city. The fire department and district share a fire hall.

There is one first responder in the city and is based in the fire hall. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by a city well and reservoir fed by a natural spring. However, the city is scheduled to receive drinking water from Barnes Rural Water District in 2015. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Kathryn. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. DRN provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.3.2 Risk Assessment and Hazard Scoring Notes

Table 8.3.2 summarizes the risk assessment scoring of the city of Kathryn. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.3.2.

Table 8.3.2 – City of Kathryn Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Kathryn | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 2 | 3 | 2 | 7 |
| Dam Failure | 4 | 3 | 3 | 3 | 1 | 12 |
| Drought | 3 | 3 | 3 | 3 | 2 | 10 |
| Flood | 3 | 2 | 3 | 3 | 2 | 9 |
| Geologic Hazard | 4 | 3 | 3 | 4 | 1 | 13 |
| Hazardous Material Release | 2 | 2 | 2 | 2 | 1 | 7 |
| Homeland Security Incident | 2 | 2 | 1 | 1 | 2 | 4 |
| Severe Summer Weather | 3 | 2 | 2 | 2 | 2 | 7 |
| Severe Winter Weather | 3 | 3 | 3 | 2 | 2 | 9 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 2 | 2 | 2 | 7 |
| Transportation Accident | 1 | 2 | 2 | 2 | 1 | 6 |
| Urban Fire/Structure Collapse | 2 | 2 | 3 | 3 | 2 | 8 |
| Wildland Fire | 2 | 2 | 2 | 3 | 2 | 7 |
| Windstorm | 3 | 3 | 3 | 2 | 2 | 9 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock. • Some people get sick each year, possible death |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 2 | <ul style="list-style-type: none"> • Proper drainage of water into the creek • Vacant lots and buildings – biggest problem, not well maintained • Residents mows most lawns and keeps vegetation under control • Large junk pile in city limits |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are eight people under the age of 20 and 23 people over the age of 65 in the city representing 15.4 percent and 44.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Vacant lots and abandoned buildings present in poor condition • More vulnerable: Large junk pile in city limits • More vulnerable: High elderly population • Less vulnerable: Very few children, 4 under the age of 18 • Less vulnerable: Trailer homes – 2 |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic or hospital, no ambulance • Internet connections, TV, etc. • No stockpile of medical supplies • Residents mows most lawns and keeps vegetation under control • First responder & EMT |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Kathryn is gone/total loss • Large property loss and mass casualties |
| Frequency | 3 | <ul style="list-style-type: none"> • Large chunk broke off from the dam in 2009 • In 1975 about 7 inches of rain fell and dam became overwhelmed |
| Likelihood | 3 | <ul style="list-style-type: none"> • Increased draining of water into Clausen Springs, built for 19 sections, now handles 90 sections and is ever increasing • Complete mitigation project strengthened the Dam and hopefully decreases the likelihood • Installation of drain tile will increase runoff into Clausen Springs |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Large elderly population • More vulnerable: Trailer homes • More vulnerable: Dam is 4 to 7 miles from the city • More vulnerable: Little to no warning window • More vulnerable: Highway 21 would hold back water for period of time |

| | | |
|-------------------|---|--|
| Capability | 1 | <ul style="list-style-type: none"> • Low tax base and little financial resources of the city • No plans in place (evacuation, etc.) • National Guard can assist • Small town with good neighbors, helping hands, willing to help out |
|-------------------|---|--|

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs, casualties (possible) • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Lower water supplies/water shortages • Impacts local food supplies |
| Frequency | 3 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length. • In 2013, dry conditions for June to October - little to no rain • Around 1 inch of rain, same as 2014, soil is cracking and dry, currently a water shortage |
| Likelihood | 3 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable. • Not a lot of drain tile in the area – however farmers are started to install • Too much irrigation of cropland uses water resources • Leak of reservoir which is still unknown, up to 5,000 gallons lost per day |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Elderly population • Less vulnerable: Residents have individuals wells and springs that run into the reservoir • Less vulnerable: Everyone preserves rain water, uses river and creek |
| Capability | 2 | <ul style="list-style-type: none"> • No water from Barnes Rural Water District – in the paper work phase • Individual wells and preserves rain water • People use river and creek as well • Fire department has equipment for moving of water • 28,000 gallon reservoir, but is currently leaking |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads in the city • Increased mosquitos-many transmit disease due to lots of grass and debris laying around • Basement have become flooded • Residents have sump pumps running 24/7 • Large property loss, vehicles, personal property • Some casualties |
| Frequency | 2 | <ul style="list-style-type: none"> • Only happens when a lot of precipitation or snow in the winter |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Depends largely on the weather • Sump pumps are constantly running |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Runoff from hills into the creek that runs through town • Due to lack of storm water system, is likely in the future • High water table • Drainage from drain tile into Clausen Springs and other sections |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: Large elderly population • More vulnerable: Water caused backup into drinking water system • More vulnerable: Water from creek backed up into lift station – vulnerable area |
| Capability | 2 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • National Guard for help • Fire department has equipment to pump water • Sump pumps • First responder & EMT • Two culverts-allows drainage into creek • No set plans in place, low tax base |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, property, and economy • Reduction in tax base from loss of desirability as place to live • Damage to streets, power lines, gas lines, electric lines, water lines • Disruption in transportation mobility • Disruption in availability of drinking water • Potential loss of sewer service |
| Frequency | 3 | <ul style="list-style-type: none"> • Three instances of disruption to drinking water to the city in 2014 • Varying dry conditions do not replenish spring-fed reservoir causing issues to water pressure in the system |
| Likelihood | 3 | <ul style="list-style-type: none"> • Aging water pipes break when water pressure is not adequate from drought or heavy precipitation from other hazards • Connection to Barnes Rural Water District |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Large elderly population • More vulnerable: Water pipes from main lines to each individual residence are aging and prone to breaking • More vulnerable: Lack of reliable provider of water • More vulnerable: The entire town is vulnerable due to small size and location |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the county • Limited administrative and city staff |

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, crops, and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility |
| Frequency | 2 | <ul style="list-style-type: none"> • Never had any major occurrences |
| Likelihood | 2 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • Trucks transporting larger tanks, carrying more chemicals • Signs prohibit trucks from entering city limits-decreases likelihood • No anhydrous tanks – decreases likelihood, no chemicals at all |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area • More vulnerable: No chemicals stored in the city • More vulnerable: Elderly population • More vulnerable: Small size-would impact all areas of the city |
| Capability | 1 | <ul style="list-style-type: none"> • No stockpile of medical supplies • People are signed up for Code Red – whole town is signed up • Covered by Barnes County Ambulance • First responder & EMT • No official truck route, but posted signed to prohibit truck traffic in town, posted through the county |

Homeland Security Incident

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.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss population |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 1 | <ul style="list-style-type: none"> • Less vulnerable: No major employers • Less vulnerable: No school in the city • Less vulnerable: No dense or large population in the area |
| Vulnerability | 1 | <ul style="list-style-type: none"> • Small town, everyone is impacted, fearful, anxious • Right off a highway - evacuation route |
| Capability | 2 | <ul style="list-style-type: none"> • Community hall and fire hall for gathering of residents • Sheriff’s department – Barnes • First responder & EMT • No real plans in place or financial tax base |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Property damage to community buildings • Lighting strike could cause a fire to buildings • Loss of life, injury • Cars become stalled • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings • Lightning strike to power pole and trees. Power outages can occur. • Possible displacement of an estimated three people based on an average household size of 1.44 people and two mobile home structures |
| Frequency | 2 | <ul style="list-style-type: none"> • Heavy rain from time to time during summer months • Couple high winds and strong storms per summer season |
| Likelihood | 2 | <ul style="list-style-type: none"> • Lack of storm water drain • Not a lot of heavy rains in recent years |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are eight people under the age of 20 and 23 people over the age of 65 in the city representing 15.4 percent and 44.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Roads can become blocked-heavy rains, trees, blown debris. • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower • More vulnerable: Two trailer homes • Less vulnerable: Roads in and out of town are well maintained, provide continued access for the city |
| Capability | 2 | <ul style="list-style-type: none"> • No inert landfill for debris • Fire department has equipment • Have adopted state building codes • First responder & EMT • Fire hall, community hall • Small tax base • Active city council |

Severe Winter Weather

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

| | | |
|---------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Severe low temperatures-increase utility costs • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources |
|---------------|---|---|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Increased cost for snow removal if we have heavy snow • Highways can become icy reducing mobility speeds • Heavy rain results in melting and potential flooding in the spring • Possible displacement of an estimated three people based on an average household size of 1.44 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area • High winds and ground blizzard conditions |
| Likelihood | 3 | <ul style="list-style-type: none"> • Will happen in the future due to our climate. • Removal of shelter belts and vegetation leads to more ground blizzard conditions |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are eight people under the age of 20 and 23 people over the age of 65 in the city representing 15.4 percent and 44.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Lack of paved streets • More vulnerable: Can block the access to town from blocked roads • More vulnerable: Elderly population • Less vulnerable: Good county shop located in the city |
| Capability | 2 | <ul style="list-style-type: none"> • Local residents do snow removal-county is effective as well • Some residents have alternative sources of heat • Fire hall as shelter due to in-floor heat • Adopted state building codes • Independent, small town good neighbors-help each other out • First responder & EMT |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages • Elderly individual impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water, limited septic system functionality-sanitary sewer • Costly to the city to take care of the issue |
| Frequency | 2 | <ul style="list-style-type: none"> • Power outages-not long lasting, mostly momentary, up to 2 or 3 hours • Never an issue with water • Never any issues with food, people stock up |
| Likelihood | 2 | <ul style="list-style-type: none"> • County clears roads-does real well • Some residents has their own generator • Clearing of street is done by local residents, county comes with plow if really needed • No improvements to power infrastructure planned, no burying of lines |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No grocery |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: No gas station • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues • More vulnerable: Elderly population and getting medication • More vulnerable: Individual wells, not hooked up to Barnes Rural Water yet • Less vulnerable: Some people grow local food supply – few |
| Capability | 2 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • County is good at clearing roads • Fire department has equipment • Small size of community: people willing to help out, come together |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|---|
| Impact | 1 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles |
| Frequency | 2 | <ul style="list-style-type: none"> • Nothing major in the area in recent years • Motorcycles accident on the highway on the 4th of July on gravel road south of town-2014 |
| Likelihood | 2 | <ul style="list-style-type: none"> • Frequently patrolled by county sheriff - decreases speeding & likelihood • Signs prohibiting truck from traveling on city streets other than county road |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Lack of paved streets-soggy roads, pot holes • More vulnerable: Elderly population • More vulnerable: Lack of street signage, cross walks, sidewalks • Less vulnerable: Sheriff is good at patrolling county 21 |
| Capability | 1 | <ul style="list-style-type: none"> • No clinic or local ambulance • No medical supplies in stock • People have large trucks, tractors, equipment-farmers mostly • Cell phones for immediate calls for help • First responder & EMT • Fire hall has truck for fire suppression and assistance in accidents |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings |
| Frequency | 2 | <ul style="list-style-type: none"> • No real incidents • Chimney fire on a house in 2012 |
| Likelihood | 3 | <ul style="list-style-type: none"> • Abandoned buildings, not well kept • Vegetation can become dry from drought and cause a building to fire, mostly down on large lot with debris • Installation of hydrants lowers vulnerability |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing-residents will take them in however. • More vulnerable: Distance from neighboring fire departments can lead to more issues, bigger impact, etc. • More vulnerable: mall size of town and spacing of residential structures reduces risk, however buildings on main street are close together and hazardous • More vulnerable: Abandoned buildings not well kept • Less vulnerable: No more CRP near the city • Less vulnerable: Several water supplies for backup until Rural Water comes in |
| Capability | 2 | <ul style="list-style-type: none"> • Fire department with truck and equipment • Adopted state building codes • First responder & EMT • Mutual aid with Nome and Litchville, Fingal, Fort Ransom |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|-------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers don't do much control burning, very slim • No reports of lightning impacting • 4th of July 2014-grass fire at Clausen Springs |
| Likelihood | 2 | <ul style="list-style-type: none"> • More vulnerable: Lack of fire break around the city • More vulnerable: Dry conditions each year for a couple weeks, strong winds • More vulnerable: Grassland surrounds the city • Less vulnerable: No more CRP • Less vulnerable: Installation of hydrants lowers vulnerability |

| | | |
|----------------------|---|---|
| Vulnerability | 3 | <ul style="list-style-type: none"> • Lack of manpower. Prolonged response from surrounding fire districts • Windy conditions each year • Trailer homes • Lack of fire break • No CRP • Residents maintain individual wells and sources of water • Installation of hydrants lowers vulnerability • Lots of grass and vegetation in the area to the north mostly but on all sides of city |
| Capability | 2 | <ul style="list-style-type: none"> • Adopted state building codes • Mutual aid with Nome and Litchville, Fingal, Fort Ransom • Small man power • Fire department with equipment-four trucks, Fire Hall • First responder & EMT |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Toppled trees, uprooted • Loss of life, injury • Loss of crop and livestock • Loss of power • Could start a fire of buildings and structures - allow grass fire to spread • Possible displacement of an estimated three people based on an average household size of 1.44 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Straight line winds mostly in summer months, tree debris • Damaged former hardware store building on main street, going to tear building down, beyond repair |
| Likelihood | 3 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly • Cyclical weather patterns could increase or decrease • Lack of buildings on west side of city-wind has direct access into town • Location in lower part of the surrounding area |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are eight people under the age of 20 and 23 people over the age of 65 in the city representing 15.4 percent and 44.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Power lines in town not buried • Less vulnerable: Fire hall for shelter • Less vulnerable: Redundancy in power grid |
| Capability | 2 | <ul style="list-style-type: none"> • Adopted state building codes • Residents that have equipment for cleanup • Fire department has equipment • Lack of manpower in general due to small size • First responder & EMT |

8.3.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Kathryn.

Problem Statement

Located in proximity to Clausen Springs Dam, which experienced major erosion in 2009, the city of Kathryn is vulnerable to a dam failure event. The Clausen Springs Dam and the Sheyenne River Valley National Scenic Byway attract recreation and temporary populations during summer months. The city is also located in a low point with respect to surrounding topography and is near the Sheyenne River, which contributes to overland flooding issues. The emergency siren on the fire hall is manually activated. The city of Kathryn’s water supply is furnished by a spring-fed reservoir above the city and potable water is piped into the city. Two hazards threaten the city’s water supply: geologic hazard, specifically landslide, and drought. The geologic hazard of landslide has caused the city of Kathryn to experience numerous water supply line breaks over the years. There have been four waterline breaks in 2014 alone. In addition, the reduced amount of rainfall has reduced the amount of water flowing into the collection site threatening the availability of potable water. The city receives tax revenue from rental income on a former school house occupied by Valley City State University for research purposes. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Education and outreach, flood control measures, installation of new and upgrading of water infrastructure, installation of a generator for backup power and an upgraded emergency siren are a priority for the city.

City of Kathryn Project 1: Increase education and awareness of wildfire prevention for temporary and recreation populations.

| | |
|--------------------------|---|
| Description/Benefit | Make the public aware of risk to structures from camp fires, outdoor cooking and general recreational activity. |
| Hazards Addressed | Urban Fire/Structure Collapse, Wildland Fire |
| Affected Jurisdictions | City of Kathryn |
| Project Status | New |
| Priority | Low |
| Responsible Agency | Kathryn City Council Kathryn Fire Department |
| Partners | City, state, federal, local government, EM |
| Timeframe for Completion | Ongoing |
| Cost | \$5,000 per year |
| Funding Source | Local, state, federal, private |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Kathryn Project 2: Create and implement creek maintenance.

| | |
|--------------------------|--|
| Description/Benefit | Maintain flow of runoff to eliminate standing water and flooding of people’s homes. To control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Communicable Disease, Fire, Flood, Severe Summer Weather, Severe Winter Weather, Windstorm |
| Affected Jurisdictions | Kathryn |
| Project Status | Continue |
| Priority | High |
| Responsible Agency | Kathryn City Council Barnes County Water Resource District Manager |
| Partners | State Water Commission, township board |
| Timeframe for Completion | 1 to 2 years |
| Cost | \$500 to \$1,000 |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 4 | 5 | 5 | 34 |

City of Kathryn Project 3: Install generators for the city lift station and fire hall.

| | |
|--------------------------|---|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system to ensure resiliency. To maintain continued operation of the fire hall and emergency siren. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Kathryn |
| Project Status | Continue |
| Priority | High |
| Responsible Agency | Kathryn City Council Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state, federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Kathryn Project 4: Install upgraded warning system.

| | |
|--------------------------|---|
| Description/Benefit | Install updated warning siren replacing manually-activated siren with county-dispatch-activated siren. The siren provides warning for people to take shelter from approaching storms. |
| Hazards Addressed | Fire, Severe Summer Weather, Windstorm |
| Affected Jurisdictions | City of Kathryn |
| Project Status | New |
| Priority | High |
| Responsible Agency | Kathryn City Council Barnes County Emergency Manager |
| Partners | Barnes County Commission, fire departments and districts |
| Timeframe for Completion | 1 to 3 years |
| Cost | \$7,500 per siren |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Kathryn Project 5: Develop new and upgrade existing water delivery system.

| | |
|--------------------------|---|
| Description/Benefit | Barnes Rural Water District pipeline extension to the city. Eliminate breaks and leaks in the current system to assure delivery of potable water. |
| Hazards Addressed | Communicable Disease, Drought, Flood, Geologic Hazard (Landslide), Shortage or Outage of Critical Materials or Infrastructure, Severe Summer Weather, Severe Winter Weather |
| Affected Jurisdictions | City of Kathryn |
| Project Status | New |
| Priority | High |
| Responsible Agency | Kathryn City Council, Barnes Rural Water District, Rural Development |
| Partners | Barnes County Commission, State Water Commission |
| Timeframe for Completion | 2 to 3 years |
| Cost | \$2,500 per house and/or structure / \$162,500 for all city structures |
| Funding Source | USDA Rural Development, CDBG, FEMA |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

8.3.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Kathryn with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Kathryn.

The city of Kathryn has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer on staff, but can contract for engineering services when needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or another entity for planning, grant writing and grant administration services. The city does not have any infrastructure maintenance programs, but does conduct maintenance on an as-needed basis. Mutual aid agreements are signed with the cities of Fingal, Litchville, Nome, and Fort Ransom in neighboring Ransom County, and is also covered under the county-wide mutual aid agreement. The city has an emergency siren located on top of the fire hall, but it is not adequate as it is manually activated. The city does not have a generator for backup power. The fire ISO rating for the city is eight. The city does not have a fire index sign. Emergency services are not GIS capable. However, the fire district/department does have radios connected to county dispatch for improved communication. The fire district/department chief reports hazard data to the emergency manager. The city does not have Firewise or StormReady Certification.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Kathryn.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A

website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. The city does not have any entities providing public education on hazards, but has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Kathryn.

The city maintains a capital improvements fund through a special assessment of \$10 on the water bill every month. The city does not have storm water utility fee as it lacks a storm water system. The city does special assess \$21.50 per month on the garbage and sewer bill for maintenance of the sanitary sewer system. The city took out a bond from the Bank of North Dakota for a sewer project. The city issues building permits. The city has access to CDBG funds through the SCDRC. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation. The city also rents out a former school house located south of the city to Valley City State University for \$250 per month for the Prairie Waters Research Program. This revenue can also be used for mitigation if needed.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Kathryn.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city has zoning in place. The city does not have subdivision ordinances or impact fees, but does issue building permits. The city council serves as the planning commission for the city. The city adopted state building codes 15 years ago, but does not have an inspector. The city is FEMA flood mapped but does not have flood ordinances. However, the city does have a flood damage reduction study from 1987 that can be used for mitigation. The city also have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.4 City of Leal

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.4.1, 8.4.2, 8.4.3, and 8.4.4. Figure 8.4.1 shows an aerial view of the city of Leal with the city limits.

Figure 8.4.1 – City of Leal



Source: Barnes County Emergency Management

8.4.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Leal. Detailed narratives follow each section heading to profile the city. Additional information on the city of Leal and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Leal is located on N.D. State Highway 9, approximately 30 miles northwest of Valley City in Barnes County.

Population

The population is 20 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Leal consists of five individuals under the age of 20, and three individuals over the age of 65, representing 25.0 percent and 15.0 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 14 housing units in the city consisting of single-family homes. There are no multifamily units or mobile homes in the city of Leal.

Services Provided

The city of Leal obtains potable water from Barnes Rural Water District. The city does not have a sanitary sewer system or lagoon. City residents maintain septic systems. The city does not have a storm water system. There are no lift stations in the city as it does not have a sanitary sewer system. Dakota Sanitation provides garbage services. The city does not maintain an official inert landfill, but inert debris is disposed of in fields to the east of the city. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Leal maintains a park with playground equipment, a picnic areas and a basketball court. The city does not have a city hall, community center, city shop, county shop, library, armory, post office, school, swimming pool, airport or golf course. The fire hall serves as the storm shelter and city hall. There are no county, state or federal government buildings in the city. There are 14 single-family homes and no multifamily units or mobile homes in the city of Leal as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The city contracts with the Dazey Fire Department and District to provide fire protection to the

city and surrounding area. The city, however, possesses a fire truck and fire hall. There is one first responder in the city and is based in the fire hall. The first responder takes calls from Jamestown or Valley City and is certified through the Wimbledon Fire Department. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Leal. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.4.2 Risk Assessment and Hazard Scoring Notes

Table 8.4.2 summarizes the risk assessment scoring of the city of Leal. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.4.2.

Table 8.4.2 – City of Leal Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Leal | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 2 | 1 | 2 | |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 2 | 2 | 1 | 1 | 3 | 3 |
| Flood | 4 | 2 | 3 | 3 | 2 | 10 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 4 | 1 | 13 |
| Homeland Security Incident | 4 | 2 | 2 | 3 | 2 | 9 |
| Severe Summer Weather | 4 | 3 | 3 | 3 | 2 | 11 |
| Severe Winter Weather | 3 | 3 | 4 | 4 | 2 | 12 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 3 | 4 | 4 | 2 | 12 |
| Transportation Accident | 4 | 2 | 3 | 4 | 2 | 11 |
| Urban Fire/Structure Collapse | 2 | 2 | 2 | 3 | 1 | 8 |
| Wildland Fire | 4 | 2 | 2 | 3 | 1 | 10 |
| Windstorm | 4 | 3 | 3 | 3 | 2 | 11 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock. • Some people get sick each year, possible death |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 2 | <ul style="list-style-type: none"> • Due to standing water possible increase in the West Nile virus cases and mosquito problems • Abandoned have been removed – decreases likelihood. • City mows most lawns and keeps vegetation under control. |
| Vulnerability | 1 | <ul style="list-style-type: none"> • There are five people under the age of 20 and three people over the age of 65 in the city representing 25.0 percent and 15.0 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Barnes County North located two miles to the west • Less vulnerable: One elderly resident and two under 18 • Less vulnerable: Abandoned have been removed – decreases vulnerability • Less vulnerable: Abandoned vehicles have been removed. • Less vulnerable: More vulnerable: Barnes County North located two miles to the west |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic or hospital, no ambulance • Internet connections, TV, etc. • No stockpile of medical supplies • Mowing through special assessment to keep vegetation under control • First responder |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Leal.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs, • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Lower water supplies • Impacts local food supplies |
| Frequency | 2 | <ul style="list-style-type: none"> • 1988 |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Some dry conditions each year, couple weeks in length. • In 2013, dry conditions for June to October - little to no rain • Around 1 inch of rain |
| Likelihood | 1 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable. • Not a lot of drain tile in the area – is not foreseen as future issue |
| Vulnerability | 1 | <ul style="list-style-type: none"> • More vulnerable: Elderly individual and two younger people • More vulnerable: Sloughs by railroad tracks-never mowed and could become start and spread if the wind is right. • Less vulnerable: Mowing through special assessment to keep vegetation under control • Less vulnerable: Residents have backup individuals wells |
| Capability | 3 | <ul style="list-style-type: none"> • Water from Barnes Rural Water District • Has truck to move water • Individual wells |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Blocked roads in the city • Long-term health risks due to mold and disease from standing water • Increased mosquitos-many transmit disease • Basement have become flooded • Residents have sump pumps running 24/7 • Overland flooding from 2009 flood-water came from 10 Mile Lake which is one mile away. Water came from Northeast. Most town residents were impacted. • Had to cut a road to allow drainage of water. Culvert is now installed on Railway Avenue and Third Street. |
| Frequency | 2 | <ul style="list-style-type: none"> • When raining heavy, roads become blocked and standing water • Each year it occurs • Sump pumps are constantly running each summer |
| Likelihood | 3 | <ul style="list-style-type: none"> • More vulnerable: Heavy spring melting to heavy rains occurs yearly • More vulnerable: Heavy rains each year • More vulnerable: Due to lack of storm water system, is likely in the future • More vulnerable: High water table • More vulnerable: Culvert installed on Railway Avenue decreases likelihood of standing water |
| Vulnerability | 3 | <ul style="list-style-type: none"> • Overland flooding from 2009 flood-water came from 10-mile lake which is one miles away • High elderly population • Individual septic systems can be impacted, may cause sewer backups. • High water table • East end of town receives heavy flooding from spring melt, drainage of water, etc. • Elderly person and two young children |

| | | |
|-------------------|---|--|
| Capability | 2 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • Fire department has equipment to pump water, somewhat effective • Barnes County Water District • Sump pumps • No set maintenance programs of culvert, don't on an as-needed basis • First responder |
|-------------------|---|--|

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Leal.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility |
| Frequency | 2 | <ul style="list-style-type: none"> • Never had any major occurrences |
| Likelihood | 4 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • Trucks transporting equipment have larger tanks, carrying more chemicals • More oil trains coming through, railroad busy in general with material. Scored 4 because of the RR by itself. Average of 20-minute frequency, around 20+ trains per day. • Main line CP railway providing ammonia to the plant, sits on tracks at times, runs through the middle of town |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area • More vulnerable: People are signed up for Code Red • More vulnerable: Railroad right through the city – bisects the city • More vulnerable: Agrium Ammonia storage two miles east of town • More vulnerable: Main line CP railway providing ammonia to the plant, sits on tracks at times, runs through the middle of town • More vulnerable: Chemicals are storage in town-sprayers are filled in the city, north end of the city |
| Capability | 1 | <ul style="list-style-type: none"> • No stockpile of medical supplies • Covered by Barnes County Ambulance • First responder |

Homeland Security Incident

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.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss of population |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 2 | <ul style="list-style-type: none"> • No major employers • Barnes County North located two miles away |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Right off major rail line, off a highway evacuation • More vulnerable: Elderly individual, two kids • More vulnerable: Barnes County North located two miles away • Less vulnerable: No buildings for communal |
| Capability | 2 | <ul style="list-style-type: none"> • Sheriff’s department – Barnes • First responder |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornados.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Lighting strike could cause a fire to buildings • Loss of life, injury • Cars become stalled • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings • Lightning strike to power pole and trees. Power outages can occur. • Possible displacement of an estimated three people based on an average household size of 1.44 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain from time to time during summer months • Hail 3 miles south in 2014 • Couple high winds and strong storms per summer season |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of storm water drain • Heavier rains in recent years, more intense rain. More of a downpour than slow and steady |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are five people under the age of 20 and three people over the age of 65 in the city representing 25.0 percent and 15.0 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Elderly individual, two young • More vulnerable: Roads can become blocked-heavy rains, trees, blown debris • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: City park has many fallen branches • More vulnerable: Lack grade-separated access to town from railroad |
| Capability | 2 | <ul style="list-style-type: none"> • No inert landfill for debris • Fire department has equipment • Has not adopted building codes • First responder |

Severe Winter Weather

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

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal if we have heavy snow • Highways can become icy reducing mobility speeds • Possible displacement of an estimated three people based on an average household size of 1.44 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area • High winds and ground blizzard conditions-always blocks roads to Highway 9 • 4 to 5 times a winter with strong storms |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future due to our climate • Removal of shelter belts and vegetation leads to more ground blizzard conditions • Nothing to the west of town to block snow |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are five people under the age of 20 and three people over the age of 65 in the city representing 25.0 percent and 15.0 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Elderly individual, two young • More vulnerable: Lack of paved streets • More vulnerable: Can block the access to town, stop to switch cars, block roads • More vulnerable: Nothing to the west of town to block snow • More vulnerable: Lack grade separated access to town from railroad |
| Capability | 2 | <ul style="list-style-type: none"> • Local residents do snow removal • Some residents have alternative sources of heat • No shelter • No building codes • Independent, small town good neighbors-help each other out • First responder |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages • Elderly individual impacted from loss of electric and medical supplies. • Reduced mobility • Limited drinking water, limited septic system functionality-sanitary sewer • Costly to the city to take care of the issue. • Lightning strike causes power outage |
| Frequency | 3 | <ul style="list-style-type: none"> • Some blocked roads during winter months up to a day, couple times during the season • Power outages-somewhat • Blocked access to town from trains on tracks-daily |
| Likelihood | 4 | <ul style="list-style-type: none"> • Roads become blocked to town from trains on tracks-daily • Snow drifts block roads in winter months • Some residents has their own generator • Clearing of street is hired out to a local resident |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No grocery • More vulnerable: No gas station • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues • More vulnerable: Lack grade separated access to town from railroad • Less vulnerable: Some people grow local food supply – few |
| Capability | 2 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • Fire department has equipment • Small size of community: people willing to help out, come together • First responder |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|-------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles • Explosions from oil cars – mass casualties • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Nothing major in the area in recent years • Derailments of train east of town-resulted in a fatality. In 1990s |
| Likelihood | 3 | <ul style="list-style-type: none"> • Increased oil train traffic • Stalling of trains on tracks |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Trains are stopped on a daily basis • Arms installed in 1980s • Lack of stop lights, stop signs. Yield signs out on Highway 9. |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Lack of paved streets-soggy roads, pot holes • More vulnerable: Barnes County North-students can be reckless, careless. School lets out at 3:30 pm. • More vulnerable: Lack of grade separated crossing with railroad and highway |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic or local ambulance • No medical supplies in stock • People have large trucks, tractors, equipment-farmers mostly • Cell phones for immediate calls for help • First responder |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings |
| Frequency | 2 | <ul style="list-style-type: none"> • No recent fires in memory • Intentional removal of abandoned buildings by use of fire by residents |
| Likelihood | 2 | <ul style="list-style-type: none"> • Intentional removal of abandoned buildings by use of fire by residents • Mowing of lawns keeps vegetation calm |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Elderly individual, two kids • More vulnerable: Lack of alternative housing-residents will take them in however • More vulnerable: No back up water supply • More vulnerable: Distance from neighboring fire departments can lead to more issues, bigger impact, etc. • More vulnerable: Small size of town and spacing of structures reduces risk • Less vulnerable: Mowing of lawns keeps vegetation calm • Less vulnerable: Intentional removal of abandoned buildings by use of fire by residents • Less vulnerable: Removal of abandoned vehicles • Less vulnerable: No more CRP near the city |
| Capability | 1 | <ul style="list-style-type: none"> • Fire department with truck and equipment • No building codes • First responder |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers don't do much control burning • No reports of lightning impacting |
| Likelihood | 2 | <ul style="list-style-type: none"> • Lack of fire break around the city • Dry conditions each year for a couple weeks. Strong winds. • No more CRP • Railroad through town ROW |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of manpower. Prolonged response from surrounding fire districts. • More vulnerable: Windy conditions each year • More vulnerable: Lack of fire break • More vulnerable: Railroad ROW through town • More vulnerable: Backup water supply for the city. However, residents maintain individual wells and sources of water. • Less vulnerable: No CRP |
| Capability | 1 | <ul style="list-style-type: none"> • No building codes • Mutual aid agreements are not signed. Do have one through the County. • No man power • Fire department with equipment-one truck • First responder |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Loss of life, injury • Loss of crop and livestock • Loss of power • Could start a fire • Can moved train cars off the tracks-result in a HAZMAT or fire • Possible displacement of an estimated three people based on an average household size of 1.44 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions |
| Likelihood | 3 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly • Cyclical weather patterns could increase or decrease • Lack of buildings on west side of city-wind has direct access into town |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Power lines in town not buried |

| | | |
|-------------------|---|---|
| | | <ul style="list-style-type: none"> • More vulnerable: No shelters • More vulnerable: Lack of intermittency in power grid with one feeder • Less vulnerable: Intentional removal of abandoned buildings by use of fire by residents • Less vulnerable: Removal of abandoned vehicles |
| Capability | 2 | <ul style="list-style-type: none"> • No building codes • No inert landfill • Residents that have equipment for cleanup. • Fire department has equipment • Lack of manpower • Independent, small town good neighbors-help each other out. • First responder |

8.4.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Leal.

Problem Statement

The city of Leal experiences overland flooding from 10 Mile Lake due to surrounding topography and inadequate drainage, which impacts infrastructure. The culvert under the CPR railroad line is suspected to have collapsed, further exacerbating flooding issues. The city has a manually-activated emergency siren instead of a siren activated by county-dispatch. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage/flood control measures and an upgraded emergency siren are a priority for the city.

City of Leal Project 1: Upgrade culvert under CPR railroad line to improve drainage.

| | |
|--------------------------|---|
| Description/Benefit | Improve drainage and eliminate overland flooding issues that causes damage to infrastructure and people’s homes. Maintain flow of runoff to control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Communicable Disease, Fire, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Windstorm |
| Affected Jurisdictions | City of Leal |
| Project Status | New |
| Priority | High |
| Responsible Agency | Leal City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | Barnes County Commission, fire departments and districts, CPR |
| Timeframe for Completion | 3 to 5 years |
| Cost | Project specific |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 2 | 5 | 5 | 31 |

City of Leal Project 2: Install upgraded warning system.

| | |
|--------------------------|---|
| Description/Benefit | Install updated warning siren replacing manually-activated siren with county-dispatch-activated siren. The siren provides warning for people to take shelter from approaching storms. |
| Hazards Addressed | Fire, Severe Summer Weather, Windstorm |
| Affected Jurisdictions | City of Leal |
| Project Status | New |
| Priority | High |
| Responsible Agency | Leal City Council, Barnes County Emergency Manager |
| Partners | Barnes County Commission, fire departments and districts |
| Timeframe for Completion | 1 to 3 years |
| Cost | \$7,500 per siren |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

8.4.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Leal with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Leal.

The city of Leal has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer on staff, but can contract for engineering services when needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services as it does not have staff for those capabilities. The city conducts mowing on vacant lots and charges \$300 per year per lot. Other infrastructure maintenance is conducted on an as-needed basis. The city has a mutual aid agreement for emergency services through the county-wide agreement. The city has an emergency siren located on top of the fire hall, but it is not adequate as it is manually activated. The city does not have any generators. The fire ISO rating for the city is unknown. The city does not have a fire index sign. Emergency services are not GIS capable. The city council reports hazard data to the emergency manager. The city does not have Firewise or StormReady Certification.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Leal.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. However, Barnes County

North is located approximately three miles west of the city where education and outreach is provided to students. The city does not have any entities providing public education on hazard, but has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Leal.

The city maintains a general fund and not a separate account for capital improvements. The city does not have storm water utility fee as it lacks a storm water system. The city does not assess any sanitary sewer fees despite having a sanitary sewer system. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits through the county. The city has access to CDBG funds through the SCDRC. The city does not have any private entities provide funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Leal.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning, but utilizes the county zoning for regulation of development. The city does not have subdivision ordinances or impact fees. The city issues building permits through the county. The city council serves as the planning commission for the city. The city adopted the county's building codes, but does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.5 City of Litchville

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.5.1, 8.5.2, 8.5.3, and 8.5.4. Figure 8.5.1 shows an aerial view of the city of Litchville with the city limits.

Figure 8.5.1 – City of Litchville



Source: Barnes County Emergency Management

8.5.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Litchville. Detailed narratives follow each section heading to profile the city. Additional information on the city of Litchville and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Litchville is located on Barnes County Highway 11, approximately 30 miles south-southwest of Valley City in Barnes County.

Population

The population is 172 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Litchville consists of 38 individuals under the age of 20, and 42 individuals over the age of 65, representing 22.1 percent and 24.4 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 100 housing units in the city consisting of 84 single-family homes, three mobile homes and 13 multifamily homes.

Services Provided

The city of Litchville obtains potable water from Barnes Rural Water District. There are no septic systems in city limits. The city has a sanitary sewer system and a lagoon. The city does not have a storm water system. The city has a lift station for the sanitary sewer system and lagoon. Sanitation Specialists provides sanitation services. The city does not maintain an inert landfill. The official newspaper is the Litchville Bulletin.

Jurisdictional Buildings

The city of Litchville maintains a city hall/community center, but does not have a city shop, library, armory, swimming pool, airport or golf course. The city has a post office and county shop. The city maintains a park with playground equipment. The city hall/community serves as a storm shelter. The city has an elementary school, which also serves as an official storm shelter. There are no state government buildings in the city. There are 84 single-family homes, 13 multifamily units and three mobile homes in the city of Litchville as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Litchville Fire Department and District provides fire protection to the city and has a fire

hall located on east Main Street. There are eight first responders in the city and are based in the fire hall. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Litchville. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. DRN provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.5.2 Risk Assessment and Hazard Scoring Notes

Table 8.5.2 summarizes the risk assessment scoring of the city of Litchville. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.5.2.

Table 8.5.2 – City of Litchville Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Litchville | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 2 | 1 | 3 | 3 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 3 | 2 | 2 | 2 | 3 | 6 |
| Flood | 2 | 2 | 2 | 2 | 2 | 6 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 3 | 2 | 1 | 2 | 3 | 5 |
| Homeland Security Incident | 1 | 1 | 1 | 1 | 2 | 2 |
| Severe Summer Weather | 3 | 3 | 4 | 3 | 1 | 12 |
| Severe Winter Weather | 2 | 3 | 1 | 2 | 3 | 5 |
| Shortage or Outage of Critical Materials or Infrastructure | 2 | 1 | 2 | 2 | 2 | 5 |
| Transportation Accident | 1 | 1 | 1 | 2 | 3 | 2 |
| Urban Fire/Structure Collapse | 1 | 1 | 2 | 3 | 2 | 5 |
| Wildland Fire | 2 | 2 | 2 | 2 | 3 | 5 |
| Windstorm | 2 | 2 | 2 | 2 | 3 | 5 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|---|
| Impact | 1 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock. • Some people get sick each year, possible death |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 2 | <ul style="list-style-type: none"> • Due to standing water possible increase in the West Nile virus cases and mosquito problems • Abandoned properties can lead to rodent infestation • City mows most lawns and keeps vegetation under control |
| Vulnerability | 1 | <ul style="list-style-type: none"> • There are 38 people under the age of 20 and 42 people over the age of 65 in the city representing 22.1 percent and 24.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Retired population – average population is 60. • More vulnerable: Abandoned properties can lead to rodent infestation • More vulnerable: Abandoned vehicles • More vulnerable: Elementary school – vulnerable population |
| Capability | 3 | <ul style="list-style-type: none"> • No clinic or hospital, county ambulance • First responders have some medical devices (AED) • Internet connections, TV, etc. • No stockpile of medical supplies |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Litchville.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes and increased utilities • Lower water supplies |
| Frequency | 2 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length • In 2013, dry conditions for June to October |
| Likelihood | 2 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable. • Not a lot of drain tile in the area thus far – could lead to issues |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: High senior population |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Abandoned buildings may result in fires • More vulnerable: Abandoned vehicles • More vulnerable: School-children |
| Capability | 3 | <ul style="list-style-type: none"> • Barnes Rural Water District • Water Tower-50,000 gallons • equipment to move water • No Individual wells • Farmers have wells • No separate water storage tanks |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Blocked roads in the city • Long-term health risks due to mold and disease from standing water • Increased mosquitos-many transmit disease • Basement have become flooded-can at times from heavy rains |
| Frequency | 2 | <ul style="list-style-type: none"> • When raining heavy, roads become blocked and is expected • Each year it occurs • Sump pumps are constantly running on a wet year |
| Likelihood | 2 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Heavy rains each year • Drainage of farmland may increase likelihood • Has storm water system • Drainage ditch on north end of town, drains storm water • High water table |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Abandoned buildings • More vulnerable: Abandoned cars • More vulnerable: High elderly population • More vulnerable: High water table • More vulnerable: City park gets hit the worst-drains but is very slow • Less vulnerable: School sits high and is not impacted • Less vulnerable: Storm water system |
| Capability | 2 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • Fire department has equipment to pump water, somewhat effective. • Barnes County Water District • Sump pumps • Has drainage ditch |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Litchville.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility |
| Frequency | 2 | <ul style="list-style-type: none"> • Anhydrous tank let off some pressure and stabilized, early 2000s • Dakota Plains keeping closer eye on the tank-may move out of town |
| Likelihood | 1 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • Trucks transporting equipment have larger tanks, carrying more chemicals • Anhydrous tank at Dakota Plains • No railroad-no trains • No located on major highways or truck routes |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area, new tower north of the town, landlines, internet • More vulnerable: People are not signed up for Code Red-most don't know • More vulnerable: High senior population, school population as well • More vulnerable: Dakota Plains anhydrous tank, chemicals and fertilizers |
| Capability | 3 | <ul style="list-style-type: none"> • No stockpile of medical supplies • Covered by Barnes County Ambulance. 8 first responders with medical devices and other AED • Dakota Plains does routine maintenance checks, has individual in charge of safety meetings |

Homeland Security Incident

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.

| | | |
|----------------------|---|--|
| Impact | 1 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss of population |
| Frequency | 1 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 1 | <ul style="list-style-type: none"> • No major employers besides Dakota Plains • Has one bar |
| Vulnerability | 1 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Right off major transportation rough-easy evacuation • More vulnerable: High senior population, school children |
| Capability | 2 | <ul style="list-style-type: none"> • Sheriff's department - Barnes • Fire department – has some equipment that can be used • Community Center for gathering and sheltering-school |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Lighting strike could cause a fire to buildings • Abandoned buildings could collapse or blow over • Loss of life, injury • Overland flooding of streets from heavy rain near park • Cars become stalled • Streets can become soggy from moisture-not all streets are paved • Straight-line winds can cause damage to buildings • Chemicals tanks were blown over • Possible displacement of an estimated five people based on an average household size of 1.72 people and three mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain from time to time • No much hail recently • Couple high winds and strong storms per summer season • Straight line winds about 6 to 7 years ago-lots of trees blew down |
| Likelihood | 4 | <ul style="list-style-type: none"> • Lack of storm water drain • Heavier rains in recent years, more intense rain. More of a downpour than slow and steady. |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 38 people under the age of 20 and 42 people over the age of 65 in the city representing 22.1 percent and 24.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population, children at school • More vulnerable: City park-overland flooding from heavy rain • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower • More vulnerable: No building codes |
| Capability | 1 | <ul style="list-style-type: none"> • No inert landfill for debris – contract through Sanitary Specialists • Fire department has equipment. • Has not adopted building codes • Small community-independent in nature, people help out • As needed maintenance by city |

Severe Winter Weather

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

| | | |
|---------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal |
|---------------|---|--|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Possible displacement of an estimated five people based on an average household size of 1.72 people and three mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area. • High winds and ground blizzard conditions-always blocks roads to N.D. Highways 1 and 46 • 4 to 5 times a winter with strong storms |
| Likelihood | 1 | <ul style="list-style-type: none"> • Will happen in the future • Removal of shelter belts and vegetation leads to more ground blizzard conditions-happening outside of town but nowhere near city limits |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are 38 people under the age of 20 and 42 people over the age of 65 in the city representing 22.1 percent and 24.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: School population • More vulnerable: Abandoned buildings and vehicles • More vulnerable: Lack of paved streets • More vulnerable: People view this as normal, are used to it, part of everyday life |
| Capability | 3 | <ul style="list-style-type: none"> • Local residents do snow removal, County does city streets • Some residents have alternative sources of heat • Community center and school as shelters • No building codes • Water tower has recirculating pump to keep water from freezing |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Long periods of time could lead to loss of life • Power outages • Downed power lines • Senior population impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water, limited sanitary sewer |
| Frequency | 1 | <ul style="list-style-type: none"> • Some blocked roads during winter months up to a day, couple times during the season • Out of power for 22 hours in April 1997 |
| Likelihood | 2 | <ul style="list-style-type: none"> • Roads become blocked -residents have equipment for clearance • Clearing of street is done by County • City has trash pump for backup if generators fail for sanitary sewer • City has two interconnections for power |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No full-service grocery • More vulnerable: High senior population, school children • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues. |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • Less vulnerable: Local bar has pizza • Less vulnerable: City has two interconnections for power • Less vulnerable: Cenex Gas Station. Also sells basic groceries. • Less vulnerable: Some people grow local food supply – few |
| Capability | 2 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • Fire department has equipment for pumping water • Small size of community: people willing to help out, come together |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|--|
| Impact | 1 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles • Blocked roads |
| Frequency | 1 | <ul style="list-style-type: none"> • Nothing major in the area in recent years |
| Likelihood | 1 | <ul style="list-style-type: none"> • City not located on major highway • Not many drivers, old population and young • Little traffic-small town |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Senior population does not drive much • More vulnerable: Lack of paved streets-soggy roads, pot holes • Less vulnerable: Not located on railroad • Less vulnerable: First responders (8) |
| Capability | 3 | <ul style="list-style-type: none"> • No clinic or local ambulance • Medical supplies and AED, limited with first responders • People have large trucks, tractors, equipment-farmers mostly • Cell phones for immediate calls for help |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|-------------------|---|---|
| Impact | 1 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings |
| Frequency | 1 | <ul style="list-style-type: none"> • No recent fires in memory |
| Likelihood | 2 | <ul style="list-style-type: none"> • Presence of abandoned buildings and absentee owners, deteriorating, more susceptible to fire • Old electrical wiring of homes-people shouldn't be living there |

| | | |
|----------------------|---|---|
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Senior population, children at school • More vulnerable: Abandoned properties are vulnerable areas, vehicles • More vulnerable: Lack of alternative housing-residents will take them in however • Less vulnerable: Good communication with fire department for alerting of an incident • Less vulnerable: Back up water supply of 50,000 gallons |
| Capability | 2 | <ul style="list-style-type: none"> • Fire department with truck and equipment • No building codes |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers do controlled burns, none become out of control |
| Likelihood | 2 | <ul style="list-style-type: none"> • Continue to have controlled burns • Lack of fire break around the city but does have rows of trees • Dry conditions each year for a couple weeks. Strong winds. • Fire department is present when controlled burns are started, notified and on alert |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Windy conditions each year • More vulnerable: Fire department is present when controlled burns are started, notified and on alert • More vulnerable: Elderly population need help with evacuation • More vulnerable: Trailer homes • More vulnerable: Lack of fire break but has trees around the city • Less vulnerable: Less CRP in the area • Less vulnerable: No vulnerable areas in city limits |
| Capability | 3 | <ul style="list-style-type: none"> • No building codes • Mutual aid agreements are not signed • Little man power on city level • Fire department with equipment • Dakota Plains has water hauling equipment • Has mutual aid with LaMoure, Sanborn, Kathryn and Marion |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|---------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Abandoned buildings could topple |
|---------------|---|--|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Loss of life, injury. • Loss of crop and livestock • Loss of power • Could start a fire • Possible displacement of an estimated five people based on an average household size of 1.72 people and three mobile home structures |
| Frequency | 2 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Usually a summer thing |
| Likelihood | 2 | <ul style="list-style-type: none"> • Heavy trees around city limits – south side lacks trees • Cyclical weather patterns could increase or decrease |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are 38 people under the age of 20 and 42 people over the age of 65 in the city representing 22.1 percent and 24.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population, school children • More vulnerable: Abandoned structures and vehicles • More vulnerable: Power lines in town not buried • More vulnerable: No official shelters, but has community center and school • More vulnerable: Older homes • More vulnerable: Trailer homes • Less vulnerable: Two power interconnections |
| Capability | 3 | <ul style="list-style-type: none"> • No building codes • No inert landfill • Residents that have equipment for cleanup • Fire department has equipment • Lack of manpower at the city level • Farmers help out, move debris, etc. • Maintenance done on an as needed basis by the city |

8.5.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Litchville.

Problem Statement

The city of Litchville is vulnerable to flooding and severe summer weather as heavy rain causes overland flooding and impacts critical facilities and infrastructure. Flooding occurs on city streets primarily near the city park. The city does have a storm water drainage system, but the system lacks the capacity to allow for property drainage. Windstorms and high wind during severe summer weather also causes damage to structures in the city. Debris can clog drainage and contribute to overland flooding. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage and infrastructure maintenance are a priority for the city.

City of Litchville Project 1: Establish permanent drainage for the city park to eliminate occurrences of overland flooding.

| | |
|--------------------------|--|
| Description/Benefit | Reduction of damage to critical facilities and infrastructure from annual flooding to assure access for emergency services and continued operation of public infrastructure. Reduce or eliminate damage to people’s homes. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Litchville |
| Project Status | New |
| Priority | High |
| Responsible Agency | Litchville City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | 1 to 3 years |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 3 | 5 | 5 | 33 |

City of Litchville Project 2: Create and implement tree trimming maintenance system.

| | |
|--------------------------|--|
| Description/Benefit | Eliminate debris from drainage ditches to maintain flow of runoff to eliminate standing water and flooding of people’s homes. To control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Communicable Disease, Fire, Flood, Severe Summer Weather, Severe Winter Weather, Windstorm |
| Affected Jurisdictions | City Litchville |
| Project Status | New |
| Priority | Medium |
| Responsible Agency | Litchville City Council, Barnes County Water Resource District Manager |
| Partners | State Water Commission, township board |
| Timeframe for Completion | 1 to 2 years |
| Cost | \$500 to \$1,000 |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

8.5.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Litchville with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Litchville.

The city of Litchville has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer on staff, but can contract for engineering services when needed. The county emergency manager is the floodplain administrator/manager. The city auditor has grant writing and administrative capabilities. The city can also contract with the SCDRC or a private firm for planning, grant writing and grant administration services. The city does not have any infrastructure maintenance programs, but conducts maintenance on trees, vegetation and the sanitary sewer system on an as-needed basis. Mutual aid agreements are signed with the cities of Kathryn and Sanborn, and the cities of LaMoure and Marion in neighboring LaMoure County. The city is also part of the county-wide mutual aid agreement for emergency services. The city has an emergency siren located on top of the water tower. The city has two generators; one for the sanitary sewer lift station and the other for the water tower to keep water circulating to avoid freezing in winter months. The fire ISO rating for the city is unknown. The city has a fire index sign located at the corner of Main Street. Emergency services are not GIS capable. The city auditor reports hazard data to the emergency manager. The city is not Firewise or StormReady certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Litchville.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A

website with hazard education is available through the county. Fire prevention week is conducted at the elementary school on an annual basis. The Litchville Fire District and Department conducts education aside from fire prevention week at the elementary school when necessary. The city also has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Litchville.

The city maintains a general fund and not a separate account for capital improvements. The city does not assess a storm water utility fee despite having a storm water system. The city uses revenue from the general fund for storm water improvements. The city does special assess \$17 per month on the property tax bill for maintenance of the sanitary sewer system. The city took out a loan for a new lagoon. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city issues building permits. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Litchville.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning, subdivision ordinances or impact fees. The city issues its own building permits. The city council serves as the planning commission for the city. The city has no adopted building codes and does not have an inspector. The city is FEMA flood mapped but does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.6 City of Nome

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.6.1, 8.6.2, 8.6.3, and 8.6.4. Figure 8.6.1 shows an aerial view of the city of Nome with the city limits.

Figure 8.6.1 – City of Nome



Source: Barnes County Emergency Management

8.6.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Nome. Detailed narratives follow each section heading to profile the city. Additional information on the city of Nome and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Nome is located on N.D. State Highway 32, approximately 28 miles south-southeast of Valley City in Barnes County.

Population

The population is 62 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Nome consists of 18 individuals under the age of 20, and 15 individuals over the age of 65, representing 29.0 percent and 24.2 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 33 housing units in the city consisting of 31 single-family homes, two mobile homes, and no multifamily homes.

Services Provided

The city of Nome obtains potable water from Barnes Rural Water District. There are no septic systems in city limits. The city has a sanitary sewer system and a lagoon. The city does not have a storm water system. The city has a lift station with two pumps located on the north side of 5th Avenue for the sanitary sewer system and lagoon. Fraedrich Transport provides garbage services. The city maintains an inert landfill located one mile south of the city on the west side of N.D. Highway 32. The official newspaper is the Enderlin Independent.

Jurisdictional Buildings

The city of Nome has a city hall and post office, and maintains a park with playground, basketball court, picnic shelter, bathroom, swing set, rocking toys, and merry-go-round. The city does not have a community center, city shop, county shop, shelter, library, armory, school, swimming pool, airport or golf course. There are no county or state government buildings in the city. There are 31 single-family homes, two multifamily units and no mobile homes in the city of Nome as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Nome Fire Department provides fire protection to the city and has a fire hall. There is a

first responder living approximately one mile south of the city of Nome, but is registered through the first responder unit in Enderlin, North Dakota. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Nome. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.6.2 Risk Assessment and Hazard Scoring Notes

Table 8.6.2 summarizes the risk assessment scoring of the city of Nome. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.6.2.

Table 8.6.2 – City of Nome Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Nome | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 1 | 3 | 1 | 6 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 2 | 1 | 1 | 4 | 1 | 7 |
| Flood | 3 | 2 | 3 | 3 | 1 | 10 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 1 | 2 | 3 | 1 | 9 |
| Homeland Security Incident | 4 | 1 | 1 | 2 | 1 | 7 |
| Severe Summer Weather | 4 | 3 | 3 | 4 | 1 | 13 |
| Severe Winter Weather | 3 | 3 | 3 | 3 | 1 | 11 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 4 | 3 | 3 | 1 | 12 |
| Transportation Accident | 2 | 2 | 3 | 3 | 2 | 8 |
| Urban Fire/Structure Collapse | 3 | 2 | 3 | 3 | 2 | 9 |
| Wildland Fire | 3 | 2 | 2 | 2 | 2 | 7 |
| Windstorm | 4 | 3 | 3 | 3 | 1 | 12 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|---|
| Impact | 1 | <ul style="list-style-type: none"> • Loss of economy from crops and/or livestock loss • Residents get sick each year • Always a possibility of human death • Communication between residents is rare limiting spread of diseases |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 1 | <ul style="list-style-type: none"> • Improvements to 5th Avenue to allow proper drainage is complete and reduces standing water • Small size of community and low population limits the odds of outbreak • Residents mow most lawns and keeps vegetation under control • City of Enderlin sprays for mosquitos |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 18 people under the age of 20 and 15 people over the age of 65 in the city representing 29.0 percent and 24.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Roughly five children under the age of 18 in town • More vulnerable: Some abandoned buildings in town • More vulnerable: No resources such an ambulance, hospital or clinic • More vulnerable: No stockpile of medical supplies • Less vulnerable: Internet connections and TV help inform residents • Less vulnerable: Residents mow most lawns and keeps vegetation under control • Less vulnerable: City of Enderlin sprays for mosquitos • Less vulnerable: Small elderly population decreases the vulnerability |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Nome.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of crop, livestock, economic activity and jobs • Casualties possible • Increased risk to buildings from fire hazards • Higher cost to cool homes resulting in increased utilities • Lower water supplies may lead to water shortages • Impacts locally-grown food supplies as water shortages may occur |
| Frequency | 1 | <ul style="list-style-type: none"> • Severe drought in 1988 • Some dry conditions each year lasting a couple weeks in length • In 2013 and 2014, dry conditions lasted for June to October |
| Likelihood | 1 | <ul style="list-style-type: none"> • Weather patterns are cyclical and unpredictable • No drain tile in the area • Too much irrigation of cropland occurs and depletes water resources • City water is provided by Barnes County Rural Water District and decreases likelihood of impacts • High water content in the soil decreases likelihood of severe drought |
| Vulnerability | 4 | <ul style="list-style-type: none"> • Less vulnerable: Water is provided by Barnes County Rural Water District • More vulnerable: City is completely dependent on the water district • More vulnerable: Abandoned structures are vulnerable to fire potential from dry conditions • Less vulnerable: Elderly Population • Less vulnerable: Fire department has equipment for moving of water • Lack of individual wells can decrease and increase vulnerability |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads • Increased mosquito and transmitting of diseases from standing water • Basements have become flooded • Residents have sump pumps running 24/7 • Large loss of property, vehicles, personal property • Some casualties are possible • Residents may miss work from flooding of basements or damage to personal property resulting in loss of economy |
| Frequency | 2 | <ul style="list-style-type: none"> • Only happens when a lot of rain falls or snow in the winter |

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Depends largely on weather patterns • Large snow melt in spring of 2010 resulted in overland flooding of 5th Avenue |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Lack of storm water system in the city for drainage • High water table • No drain tile in the area may increase amount of standing water • Topography does not allow swift drainage of precipitation, snow melt, standing water, etc. |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: Elderly population • More vulnerable: Lack storm water system for drainage • More vulnerable: City lacks equipment and infrastructure to address flooding • More vulnerable: Lack of manpower by the city and general public • Less vulnerable: National Guard for help • Less vulnerable: Fire department has equipment to pump water • Less vulnerable: Mitigation project of drainage on 5th Avenue decreases vulnerability |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Nome.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|-------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked roads leading to loss of transportation mobility • Small size of city could lead to large losses of property and people |
| Frequency | 1 | <ul style="list-style-type: none"> • Never had any major occurrences or incidences |
| Likelihood | 2 | <ul style="list-style-type: none"> • Propane is used for heating alternative • Trucks transporting larger tanks and carrying more chemicals • No anhydrous stored in tanks in city limits – decreases likelihood • No railroad hauling chemicals through city limits – decreases likelihood |

| | | |
|----------------------|---|--|
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Cell phone service standard in the area • More vulnerable: No chemicals stored in the city • More vulnerable: Elderly population • More vulnerable: Small size of city would leave all residents impacted • More vulnerable: Limited traffic control signage and enforcement on N.D. Highway 32 • More vulnerable: No stockpile of medical supplies • More vulnerable: Covered by Barnes County Ambulance - prolonged response times • More vulnerable: Lacks hazardous material route |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Homeland Security Incident

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.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Mass casualties, economic losses, and widespread panic • Potential for population loss if incident occurred |
| Frequency | 1 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 1 | <ul style="list-style-type: none"> • No major employers • No school in the city • No dense or large population in the area |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Right off a highway – evacuation route • More vulnerable: Elderly Population • Less vulnerable: Low population of school-aged children • Less vulnerable: Lack of railroad line through city limits • Less vulnerable: Community hall and fire hall for gathering of residents • Less vulnerable: First responders live nearby |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Damage to homes and community buildings from hail, broken windows, loss of shingles, fallen tree debris • Power outages • Lighting strike could cause a fire to buildings • Potential injury and loss of life • Cars become stalled due to high water • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings • Small size of city limits impacted areas and populations • Severe storms can potentially destroy majority of structures in the city • Possible displacement of an estimated four people based on an average household size of 1.88 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain from time to time during summer months • Around two-to-three high winds and strong storms per summer season • Each year structures experience damage to shingles • Each year tree branches fall and damage structures |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lacks storm water drainage systems • Heavy rains in recent years • Climatic patterns of the area will result in several storms per year |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are 18 people under the age of 20 and 15 people over the age of 65 in the city representing 29.0 percent and 24.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Lack of paved streets • More vulnerable Lack of storm drainage system • More vulnerable Lack of storm shelter • More vulnerable Prolonged response times and limited access for emergency services • More vulnerable Lack of manpower • More vulnerable Elderly Population • More vulnerable City lacks early warning system and only has a manually activated emergency siren • More vulnerable Most city residents are not signed up for Code Red • Less vulnerable: City has inert landfill • Less vulnerable: City has adopted build codes but lacks of enforcement • Less vulnerable: Fire department has equipment • Less vulnerable: Roads in and out of town are well maintained |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • Has adopted state building codes |

Severe Winter Weather

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

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads and power outages from heavy snow • Isolation of the community • Severe low temperatures can increase utility costs • Potential loss of life and injury • Loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal • Highways can become icy reducing mobility speeds • Heavy snow results in potential flooding in the spring • City streets build up with compacted snow which limits mobility and causes damage to streets • Drivers become stuck in potholes and mud on city streets • Possible displacement of an estimated four people based on an average household size of 1.88 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Happens yearly due to weather and climate in the area • High winds and ground blizzard conditions occurs each year • Ice storm occurred in 1997 resulting in temporary isolation of the community |
| Likelihood | 3 | <ul style="list-style-type: none"> • Will happen in the future due to the climate • Removal of shelter belts and vegetation around the city leads to more ground blizzard conditions in the local area |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 18 people under the age of 20 and 15 people over the age of 65 in the city representing 29.0 percent and 24.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Lack of paved streets • More vulnerable: Elderly Population • More vulnerable: Lack of equipment leaves city reliant on others for snow removal • More vulnerable: Portion of N.D. Highway 32 through the city is last priority by the State for clearing of snow • Less vulnerable: Adopted state building codes • Less vulnerable: Independent, small town and good neighbors willing to help out • Less vulnerable: High winds does not allow accumulation of snow on top of structures resulting in lower snow loads on roofs • Less vulnerable: City has contracted help to remove snow in the city |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • Has adopted state building codes |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages • Elderly individuals impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water and functionality of sanitary sewer if power outages occurred |
| Frequency | 4 | <ul style="list-style-type: none"> • Power outages occur nearly every week • Outages last longer during winter months • Never an issue with water now that city is connected to Barnes Rural Water District • Ice storm in 1997 resulted in isolation of the community with the National Guard needing to be called in |
| Likelihood | 3 | <ul style="list-style-type: none"> • County clears roads and N.D. State Highway 32 • Some residents has their own generator • Clearing of streets is done by an area farmer who is hired by the city • No improvements to power infrastructure planned such as burying power lines • Power poles and wires of the power grid are outdated |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No grocery • More vulnerable: No gas station • More vulnerable: Long response time for ambulance, police • More vulnerable: Fire department could have mobility issues from blocked roads • More vulnerable: Elderly Population • Less vulnerable: Fire department has equipment • Less vulnerable: No longer individual wells • Less vulnerable: Water provided by Barnes Rural Water District • Less vulnerable: Area residents and city have equipment to clear roads and maintain infrastructure • Less vulnerable: Some residents grow local food supply |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life and injury • Loss of economy • Loss of property such as cars and trucks • Can result in HAZMAT • Can result in fires of buildings, equipment and vehicles |
| Frequency | 2 | <ul style="list-style-type: none"> • No major accidents in the area in recent years • One accident occurred in 2008 where a driver fell asleep and rolled his vehicle |
| Likelihood | 3 | <ul style="list-style-type: none"> • Speeding traffic through the city • High truck and auto traffic through the city on N.D. Highway 32 • Lack of enforcement by County Sheriff on N.D. Highway 32 |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance with response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Lack of enforcement by County Sheriff for speeding traffic • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Lack of paved streets results in soggy roads and potential accidents • More vulnerable: Elderly Population • More vulnerable: Lack of street signage, crosswalks, sidewalks • More vulnerable: No medical supplies in stock • Less vulnerable: Fire hall has truck for fire suppression and assistance in accidents |
| Capability | 2 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • Has adopted state building codes |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|-------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Loss of community asset/buildings • Loss of multiple structures |
| Frequency | 2 | <ul style="list-style-type: none"> • No real incidents or large structure fires • Smaller fires in recent years resulting in loss of garages and sheds |
| Likelihood | 3 | <ul style="list-style-type: none"> • Abandoned buildings are not well kept • Vegetation can become dry from drought and cause a building fire |

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • City mows and maintains vegetation on city lots • Lack of ability to pump water from city hydrants • Lack of water tower and storage to feed pressure to pump water • High water table and moisture in the soil • Approximation of houses to each other could lead to loss of multiple structures • Age of structures and wiring is out of date and may increase likelihood of an incident |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing for displaced residents • More vulnerable: Tall grass around city limits could ignite a structure • More vulnerable: Distance from neighboring fire departments can lead to more issues and prolonged response times • More vulnerable: Small size of town and spacing of residential structures reduces risk, however buildings on main street are close together and hazardous • More vulnerable: Abandoned buildings are not well kept • More vulnerable: Lack of water storage or pressure vessel to increase pressure for fire suppression • Less vulnerable: Fire department has trucks and equipment • Less vulnerable: First responder located south of town • Less vulnerable: Fire hall has truck for fire suppression and assistance in incidences • Less vulnerable: Adopted state building codes • Less vulnerable: No more CRP near the city |
| Capability | 2 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • Has adopted state building codes • First responder located south of town |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|-------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, injury, and economy • Loss of farm equipment • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers don't do much control burning • No reports of lightning starting fires |
| Likelihood | 2 | <ul style="list-style-type: none"> • Lack of fire break around the city • Dry conditions each year for a couple weeks with strong winds • No more CRP |

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Grassland surrounds the city • Age of buildings and structures may result in a structure fire causing a secondary wildland fire • Abandoned buildings may cause a structure fire and can potentially result in a wildland fire |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Prolonged response from surrounding fire departments • More vulnerable: Windy conditions each year • More vulnerable: Lack of fire break • Less vulnerable: No CRP • Less vulnerable: Lots of grass and vegetation in the area surrounding the city • Less vulnerable: Fire hall has truck for fire suppression and assistance in incidences • Less vulnerable: Adopted state building codes |
| Capability | 2 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • First responder located south of town |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Damage to homes and community buildings such as broken windows, loss of shingles • Toppled trees can become uprooted and damage buildings • Loss of life and possible injury • Loss of crop and livestock • Loss of power • Could start a structure fire • Contribute to spread of wildland fire • Wind can cause accumulation of snow on city street and block roadways which results in temporary isolation • Possible displacement of an estimated four people based on an average household size of 1.88 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Straight line winds mostly in summer months • Blizzards occur frequently in winter months |
| Likelihood | 3 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly • Cyclical weather patterns could increase or decrease • Topography of area with flat land and lack of trees increases likelihood |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 18 people under the age of 20 and 15 people over the age of 65 in the city representing 29.0 percent and 24.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Power lines providing power to the city are not buried • More vulnerable: Fire hall is a small steel building and is not adequate for use as a shelter • More vulnerable: City lacks equipment to clear debris and branches or move snow • More vulnerable: Age of structures and housing stock increases vulnerability • More vulnerable: Distance to hospital and medical clinic is extensive • Less vulnerable: City has an inert landfill for debris and branches • Less vulnerable: Fire hall has truck for fire suppression and assistance in incidences • Less vulnerable: Adopted state building codes |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • First responder located south of town • Fire hall has truck for fire suppression and assistance in incidences • Adopted state building codes |

8.6.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Nome.

Problem Statement

Severe summer weather and severe winter weather produce heavy precipitation impacting the city of Nome. Windstorms are common in the area causing power outages. Windstorms also cause debris and snow drifts to block roads. Residents are vulnerable to severe weather as the city does not have an official storm shelter. The city has a manually-activated emergency siren instead of a siren activated by county-dispatch. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Burying of power lines, installation of backup generators and an upgraded emergency siren, and construction of a storm shelter are a priority for the city.

City of Nome Project 1: Install upgraded warning system.

| | |
|--------------------------|---|
| Description/Benefit | Install updated warning siren replacing manually-activated siren with county-dispatch-activated siren. The siren provides warning for people to take shelter from approaching storms. |
| Hazards Addressed | Fire, Severe Summer Weather, Windstorm |
| Affected Jurisdictions | City of Nome |
| Project Status | New |
| Priority | High |
| Responsible Agency | Nome City Council, Barnes County Emergency Manager |
| Partners | Barnes County Commission, fire departments and districts |
| Timeframe for Completion | 1 to 3 years |
| Cost | \$7,500 per siren |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Nome Project 2: Install generators for the city lift station and fire hall.

| | |
|--------------------------|---|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system to ensure resiliency. To maintain continued operation of the fire hall and emergency siren. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Nome |
| Project Status | New |
| Priority | High |
| Responsible Agency | Nome City Council, Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state, federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Nome Project 3: Construct storm shelter.

| | |
|--------------------------|--|
| Description/Benefit | To reduce or eliminate injury and death from severe weather. |
| Hazards Addressed | Flood, Severe Summer Weather, Severe Winter Weather, Fire, Windstorm |
| Affected Jurisdictions | City of Nome |
| Project Status | New |
| Priority | High |
| Responsible Agency | Nome City Council, Barnes County Emergency Manager, Barnes County Commission |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council, NDDDES, Red Cross |
| Timeframe for Completion | 3 to 5 years |
| Cost | Up to \$75,000 |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 4 | 5 | 5 | 5 | 5 | 33 |

City of Nome Project 4: Bury power lines.

| | |
|--------------------------|---|
| Description/Benefit | Maintain power for critical services. |
| Hazards Addressed | Severe Summer Weather, Severe Winter Weather, Windstorm |
| Affected Jurisdictions | City of Nome |
| Project Status | New |
| Priority | Low |
| Responsible Agency | Public Utilities: Ottertail Power Company, Federal Government, Midwest Independent System Operator (MISO) |
| Partners | Cities, count, state |
| Timeframe for Completion | Long term – 20+ years |
| Cost | Dependent on funding available from utility |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 1 | 4 | 2 | 1 | 3 | 20 |

8.6.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Nome with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Nome.

The city of Nome has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer but can contract with a private firm for civil engineering services. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city does not have staff for grant writing and administration purposes and relies on the emergency manager or the SCDRC for planning services, grant writing and grant administration. The city performs infrastructure maintenance on an as-needed basis, with the exception of mowing. The city owns mowing equipment and pays an hourly wage for mowing of city lots. The city also has a contract with the city of Enderlin in neighboring Ransom County for mosquito spraying through a grant. Mutual aid agreements are signed with the city of Enderlin for fire protection. The city is also part of the county-wide mutual aid agreement for emergency services. The city has an emergency siren located on top of the fire hall, but it is not adequate as it is manually activated. The city does not have any generators. The fire ISO rating for the city is unknown. The city does not have a fire index sign. Emergency services are not GIS capable. The city council reports hazard data to the emergency manager. The city is not Firewise certified. The city does not have StormReady Certification.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Nome.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. The city does not have any entities providing public education on hazards, but has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not have existing events where hazard education is conducted. However, the annual 4th of July community picnic and fire display provides an opportunity for hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Nome.

The city has a city improvement account and pays for infrastructure projects from the account. The account is refunded through general revenue. The city does not assess a storm water utility fee as it does not have a storm water system. The city charges a sanitary sewer fee of \$8, plus a \$4 special fee for updating the sanitary sewer system, which is placed on the water/sewer/garbage bill. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits for free. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Nome.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning, subdivision ordinances or impact fees. The city issues its own building permits for free. The city council serves as the planning commission for the city. The city adopted the state building codes in 2005/2006, but does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

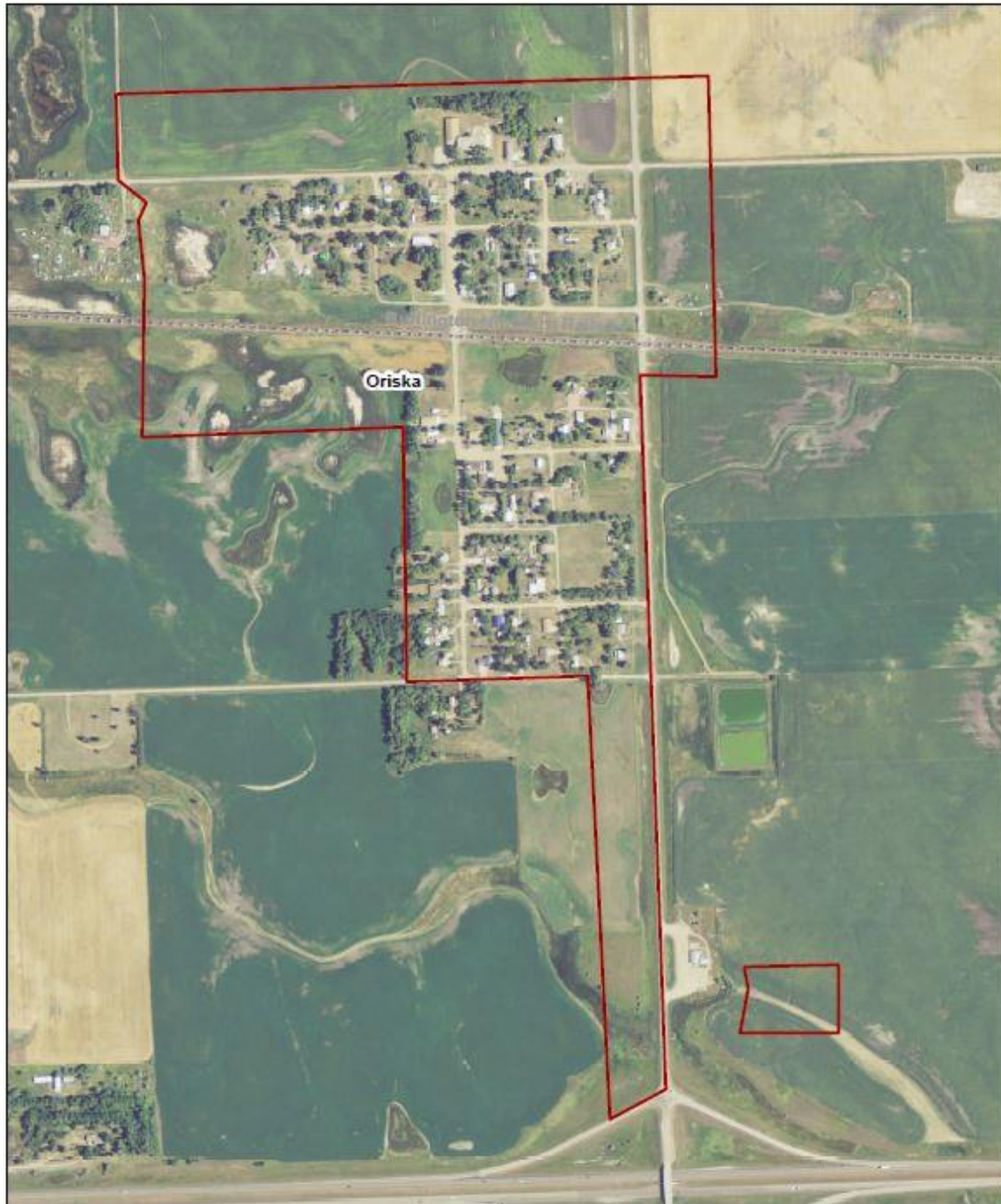
Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.7 City of Oriska

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.7.1, 8.7.2, 8.7.3, and 8.7.4. Figure 8.7.1 shows an aerial view of the city of Oriska with the city limits.

Figure 8.7.1 – City of Oriska



Source: Barnes County Emergency Management

8.7.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Oriska. Detailed narratives follow each section heading to profile the city. Additional information on the city of Oriska and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Oriska is located at the intersection of Interstate 94 and N.D. State Highway 32, approximately 10 miles east of Valley City in Barnes County.

Population

The population is 118 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Oriska consists of 35 individuals under the age of 20, and 12 individuals over the age of 65, representing 30.0 percent and 10.2 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 62 housing units in the city consisting of 41 single-family homes, nine mobile homes, and 12 multifamily homes.

Services Provided

The city of Oriska obtains potable water from Barnes Rural Water District. There are no septic systems in city limits. The city has a sanitary sewer system and a lagoon with two ponds. The city does not have a storm water system. The city has a lift station located on the south end of the railroad tracks. Waste Management provides garbage services. The city maintains an inert landfill located on the east side of the city. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Oriska has an elementary school, which serves as the community center as it has a gymnasium and multipurpose rooms. The school also serves as the official shelter. The St. Bernard Catholic church also serves as a shelter. The city has a post office. The city maintains a park with swings, playground equipment, slides and a baseball diamond. The city does not have a city shop, county shop, armory, swimming pool, airport or golf course. The city has a library at the elementary school. There are no county or state government buildings in the city. There are 41 single-family homes, 12 multifamily units and nine mobile homes in the city of Oriska as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Oriska Fire Department provides fire protection to the city and has a fire hall. The city does not have any first responders. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. MDU provides natural gas to the city. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. Bek Communications and Qwest provide phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.7.2 Risk Assessment and Hazard Scoring Notes

Table 8.7.2 summarizes the risk assessment scoring of the city of Oriska. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.7.2.

Table 8.7.2 – City of Oriska Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Oriska | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 2 | 2 | 4 | 4 | 1 | 11 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 2 | 3 | 2 | 2 | 9 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Flood | 3 | 3 | 4 | 4 | 2 | 12 |
| Hazardous Material Release | 4 | 1 | 4 | 4 | 1 | 12 |
| Homeland Security Incident | 2 | 2 | 2 | 2 | 1 | 7 |
| Severe Summer Weather | 3 | 3 | 4 | 3 | 2 | 11 |
| Severe Winter Weather | 3 | 4 | 4 | 3 | 3 | 11 |
| Shortage or Outage of Critical Materials or Infrastructure | 2 | 2 | 2 | 2 | 1 | 7 |
| Transportation Accident | 4 | 2 | 3 | 3 | 2 | 10 |
| Urban Fire/Structure Collapse | 2 | 3 | 3 | 3 | 1 | 10 |
| Wildland Fire | 4 | 2 | 2 | 2 | 2 | 8 |
| Windstorm | 3 | 2 | 2 | 3 | 4 | 6 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock. • Some people get sick each year, possible death |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 4 | <ul style="list-style-type: none"> • Due to standing water possible increase in the West Nile virus cases and mosquito problems • Abandoned properties, overgrown lawns, can lead to rodent infestation • People in town have overgrown lawns causing mosquitos and rodents. Natural vegetation too intense |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: 30% is senior population, school with kids, no day cares, up to 60 kids • More vulnerable: Abandoned properties, overgrown lawns, can lead to rodent infestation • More vulnerable: Abandoned vehicles |
| Capability | 1 | <ul style="list-style-type: none"> • No clinic or hospital • Internet connections, TV, etc. • No stockpile of medical supplies at school |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Oriska.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|-------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs, • Increased fire hazards • Higher cost to cool homes, increased utilities |
| Frequency | 2 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length • In 2013, dry conditions for July and August, little to no rain • In 2012, lawns were dry, little moisture in the soil |
| Likelihood | 3 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable • Not a lot of drain tile in the area thus far |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Drain tile is coming, will |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: High senior population • More vulnerable: Elementary school • More vulnerable: Abandoned buildings may result in fires • More vulnerable: Overgrown vegetation on yards • More vulnerable: Abandoned vehicles |
| Capability | 2 | <ul style="list-style-type: none"> • Underground 10,000 tank of backup water • Water from Barnes Rural Water District |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads in the city • Long-term health risks due to mold and disease from standing water • Lift station can become overloaded at times |
| Frequency | 3 | <ul style="list-style-type: none"> • In 1993 had some basement seepage • When raining heavy, roads become blocked and is expected |
| Likelihood | 4 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Drainage of farmland may increase likelihood • Due to lack of storm water system, is likely in the future |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Abandoned buildings • More vulnerable: Abandoned cars • More vulnerable: School with about 60 kids • More vulnerable: High elderly population – 30% • More vulnerable: Lift station in a low-lying spot • More vulnerable: Sewer system may need maintenance |
| Capability | 2 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • Fire department has equipment to pump water, somewhat effective • Barnes Rural Water Board and Water District • Individuals with equipment for drainage purposes • Sump pumps • City has a pump at water house |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Oriska.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility • Depending on material released, fires may result |
| Frequency | 1 | <ul style="list-style-type: none"> • Never has any occurrences. |
| Likelihood | 4 | <ul style="list-style-type: none"> • People do not have propane tanks in town on their properties for heating • More chemicals being stored in the area by farmers on their properties • Trucks transporting equipment have larger tanks, carrying more chemicals • More oil trains coming through |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No communication or way to spread the word if something happened other than cell phones • More vulnerable: Some speeding, but RR tracks slow people down • More vulnerable: Truck traffic carrying chemicals on Interstate 94 • More vulnerable: Railroad right through the city – bisects the city, Highway 32 as well |
| Capability | 1 | <ul style="list-style-type: none"> • No stockpile of medical supplies • Covered by Barnes County Ambulance |

Homeland Security Incident

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.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility • Depending on material released, fires may result |
| Frequency | 1 | <ul style="list-style-type: none"> • Never has any occurrences |
| Likelihood | 4 | <ul style="list-style-type: none"> • People do not have propane tanks in town on their properties for heating • More chemicals being stored in the area by farmers on their properties • Trucks transporting equipment have larger tanks, carrying more chemicals • More oil trains coming through |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No communication or way to spread the word if something happened other than cell phones • More vulnerable: People are signed up for Code Red not all • More vulnerable: Some speeding, but RR tracks slow people down • More vulnerable: Truck traffic carrying chemicals on Interstate 94 |

| | | |
|-------------------|---|---|
| | | <ul style="list-style-type: none"> • More vulnerable: Railroad right through the city – bisects the city, Highway 32 as well |
| Capability | 1 | <ul style="list-style-type: none"> • No stockpile of medical supplies • Covered by Barnes County Ambulance |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Lighting strike could cause a fire to buildings • Abandoned buildings could collapse, blown over • Loss of life, injury • Overland flooding of streets from heavy rain on southeast side near park • Cars become stalled • Streets can become soggy from moisture • Possible displacement of an estimated 17 people based on an average household size of 1.90 people and nine mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain from time to time • No much hail recently • Couple high winds and strong storms per summer season |
| Likelihood | 4 | <ul style="list-style-type: none"> • Lack of storm water drain • Heavier rains in recent years, more intense rain. More of a downpour than slow and steady |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Two emergency shelters • More vulnerable: Senior population. – 30% • More vulnerable: Roads can become blocked-heavy rains • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lift station in low-lying area |
| Capability | 2 | <ul style="list-style-type: none"> • Has inert landfill for debris. • Has two shelters for people to take cover • Fire department has equipment • Adopted state building codes |

Severe Winter Weather

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

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal • Possible displacement of an estimated 17 people based on an average household size of 1.90 people and nine mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future • Removal of shelter belts and vegetation leads to more ground blizzard conditions |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population and school • More vulnerable: Some trailer homes, abandoned buildings, abandoned vehicles • More vulnerable: Located right on Interstate 94 • More vulnerable: Fragmentation of school district may lead to stranded kids |
| Capability | 3 | <ul style="list-style-type: none"> • City has contract for snow removal • Some residents have wood burners • Two shelters • Lift station – Sanitary sewer • Building codes |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|-------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Long periods of time could lead to loss of life • Power outages-use to be frequent, not so much anymore • Senior population impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water, limited sanitary sewer • Costly to the city to take care of the issue |
| Frequency | 2 | <ul style="list-style-type: none"> • Some blocked roads during winter months up to a day, couple times during the season • In 1997, no power for 6 days to a week after snow/ice storm |
| Likelihood | 2 | <ul style="list-style-type: none"> • Roads become blocked and are difficult to maintain |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Power outages-use to be frequent, not so much anymore • New power line, better connection |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No grocery • More vulnerable: No gas station • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues • More vulnerable: No gas station • Less vulnerable: Better connection to Otter Tail • Less vulnerable: Some people grow local food supply - few |
| Capability | 3 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • Fire department has equipment • Small size of community: people willing to help out, come together |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles |
| Frequency | 2 | <ul style="list-style-type: none"> • Nothing major in the area in recent years |
| Likelihood | 3 | <ul style="list-style-type: none"> • Increase in truck traffic on 94 • Increased oil train traffic |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: Farmer 8 miles north of town has private landing strip • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Senior population does drive well • More vulnerable: Lack of grade separated crossings from Railroad • More vulnerable: Lack of paved streets-soggy roads, pot holes |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic or local ambulance • People have large trucks, tractors, equipment-farmers mostly • Cell phones for immediate calls for help |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings |
| Frequency | 3 | <ul style="list-style-type: none"> • Lost a shop in late February/early March 2014 from a fire • 2011 the Zion church burned down from electrical problem |
| Likelihood | 3 | <ul style="list-style-type: none"> • Presence of abandoned buildings and absentee owners, deteriorating, more susceptible to fire • Overgrown grass could ignite structures • Old electrical wiring, no inspector |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Senior population, school children • More vulnerable: Abandoned properties are vulnerable areas, vehicles • More vulnerable: Lack of alternative housing • More vulnerable: Lots of older homes-older wiring, dated building materials and structure • More vulnerable: Limited communication with fire department for alerting of an incident |
| Capability | 1 | <ul style="list-style-type: none"> • Fire department, fire hall and truck • Have building codes but no enforcement |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers do controlled burns – 20% become out of control |
| Likelihood | 2 | <ul style="list-style-type: none"> • Continue to have controlled burns • Lack of fire break around the city • Dry conditions each year for a couple weeks. Strong winds. • CRP is gone-decreases chances of fire |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Lack of manpower • More vulnerable: Windy conditions each year • More vulnerable: Elderly population and school-need evacuation • More vulnerable: Trailer homes • More vulnerable: Lack of fire break |
| Capability | 2 | <ul style="list-style-type: none"> • Building codes but no enforcement • Mutual aid agreements are not signed • Fire department with equipment • Fire Hall |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles. • Toppled trees. Uprooted. • Abandoned buildings could topple • Loss of life and injury • Loss of crop and livestock • Loss of power • Could start a fire • Possible displacement of an estimated 17 people based on an average household size of 1.90 people and nine mobile home structures |
| Frequency | 2 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions |
| Likelihood | 2 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly • Cyclical weather patterns could increase or decrease |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population and school • More vulnerable: Abandoned structures and vehicles • More vulnerable: Older homes • Less vulnerable: Power main to the city is buried • Less vulnerable: Two shelters |
| Capability | 4 | <ul style="list-style-type: none"> • Building codes but lack enforcement • Inert landfill • Residents that have equipment for cleanup • Fire hall for fire trucks |

8.7.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Oriska.

Problem Statement

The city of Oriska is vulnerable to floods and severe summer weather as heavy rain causes overland flooding and impacts critical facilities and infrastructure. Flooding occurs most frequently on city streets near the city park. The city does not have a storm water drainage system further contributing to flooding and drainage issues. Windstorms and high wind during severe summer weather also causes damage to structures in the city and produces shortage or outage of critical materials or infrastructure. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, and installation of backup generators and an upgraded emergency siren are a priority for the city.

City of Oriska Project 1: Establish permanent drainage for the city park and other low-lying areas in the city to eliminate occurrences of overland flooding.

| | |
|--------------------------|--|
| Description/Benefit | Reduction of damage to critical facilities and infrastructure from annual flooding to assure access for emergency services and continued operation of public infrastructure. Reduce or eliminate damage to people’s homes. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Oriska |
| Project Status | New |
| Priority | High |
| Responsible Agency | Oriska City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | 1 to 3 years |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 3 | 5 | 5 | 33 |

City of Oriska Project 2: Install generator for the city lift station and fire hall.

| | |
|--------------------------|---|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system to ensure resiliency. To maintain continued operation of the fire hall and emergency siren. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Oriska |
| Project Status | New |
| Priority | High |
| Responsible Agency | Oriska City Council, Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state, federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Oriska Project 3: Install upgraded warning system.

| | |
|--------------------------|---|
| Description/Benefit | Install updated warning siren replacing manually-activated siren with county-dispatch-activated siren. The siren provides warning for people to take shelter from approaching storms. |
| Hazards Addressed | Fire, Severe Summer Weather, Windstorm |
| Affected Jurisdictions | City of Oriska |
| Project Status | New |
| Priority | High |
| Responsible Agency | Oriska City Council, Barnes County Emergency Manager |
| Partners | Barnes County Commission, fire departments and districts |
| Timeframe for Completion | 1 to 3 years |
| Cost | \$7,500 per siren |
| Funding Source | City, county, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Oriska Project 4: Create and implement drainage ditch maintenance system for existing drainage ditches in the city.

| | |
|--------------------------|---|
| Description/Benefit | Maintain flow of runoff to eliminate standing water blocking roads to maintain access for city residents and emergency services and continued operation of public infrastructure. Control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Oriska |
| Project Status | New |
| Priority | Medium |
| Responsible Agency | Oriska City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 3 | 3 | 5 | 5 | 31 |

8.7.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Oriska with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Oriska.

The city of Oriska has an active city council. The city does not have a chief building official or inspector. The city participates in the County LEPC. The city does not have a civil engineer on staff, but can contract with a private firm for engineering services when needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning services, grant writing and grant administration services. However, the city council and auditor have experience in grant writing and administration. The mayor can also assist in administration. The city does not have any infrastructure maintenance programs, but conducts maintenance on an as-needed basis. The city is part of the county-wide mutual aid agreement for emergency services. The city has an emergency siren located on top of the fire hall, but it is not adequate as it is manually activated. The city does not have any generators. The fire ISO rating for the city is nine. The city does not have a fire index sign. Emergency services are not GIS capable. However, city staff have smart phones and assist emergency services when needed. The city auditor reports hazard data to the emergency manager. The city does not have Firewise or StormReady Certification.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Oriska.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A

website with hazard education is available through the county. Fire prevention week is conducted at the elementary school on an annual basis in October by the Oriska Fire Department. The city also has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Oriska.

The city has a general fund and savings account that can help pay for infrastructure projects, but does not maintain an account specifically for infrastructure projects. The city does not assess a storm water utility fee as it lacks a storm water system. The city does not charge a sanitary sewer fee despite having a sanitary sewer system. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits for \$5. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Oriska.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning, subdivision ordinances or impact fees. The city issues building permits. The city council serves as the planning commission for the city. The city adopted the state building codes, but does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. However, the city is considering flood ordinances to address overland flooding issues. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.8 City of Pillsbury

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.8.1, 8.8.2, 8.8.3, and 8.8.4. Figure 8.8.1 shows an aerial view of the city of Pillsbury with the city limits.

Figure 8.8.1 – City of Pillsbury



Source: Barnes County Emergency Management

8.8.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Pillsbury. Detailed narratives follow each section heading to profile the city. Additional information on the city of Pillsbury and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Pillsbury is located on N.D. State Highway 32, approximately 30 miles north-northeast of Valley City in Barnes County.

Population

The population is 12 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Pillsbury consists of no individuals under the age of 20. Approximately six individuals are over the age of 65 representing 50.0 percent of the population.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 19 housing units in the city consisting of 17 single-family homes, two mobile homes, and no multifamily homes.

Services Provided

The city of Pillsbury receives water from Dakota Rural Water District. The city does not have a sanitary sewer system or lagoon. City residents maintain septic systems. The city does not have a storm water system. There are no lift stations in the city as it does not have a sanitary sewer system. Brager Disposal Service, Inc. provides sanitation services. The city does not maintain an inert landfill. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Pillsbury maintains a park with playground equipment, swing set, slides, barbeque area and awning with picnic tables. The city does not have a city hall, community center, city shop, county shop, library, armory, swimming pool, airport or golf course. The school closed in 1972 and the post office closed in 2011. There are no county, state or federal government buildings in the city. There are 17 single-family homes, no multifamily units and two mobile homes in the city of Pillsbury as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Hope Fire Department and District in neighboring Steele County provides fire protection and first responders to the city and surrounding areas. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Dakota Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Pillsbury. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.8.2 Risk Assessment and Hazard Scoring Notes

Table 8.8.2 summarizes the risk assessment scoring of the city of Pillsbury. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.8.2.

Table 8.8.2 – City of Pillsbury Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Pillsbury | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 2 | 3 | 1 | 7 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 2 | 2 | 3 | 2 | 2 | 7 |
| Flood | 3 | 3 | 3 | 2 | 2 | 9 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 3 | 1 | 12 |
| Homeland Security Incident | 2 | 2 | 2 | 2 | 1 | 7 |
| Severe Summer Weather | 2 | 4 | 3 | 2 | 1 | 10 |
| Severe Winter Weather | 3 | 4 | 4 | 3 | 1 | 13 |
| Shortage or Outage of Critical Materials or Infrastructure | 2 | 2 | 2 | 2 | 2 | 6 |
| Transportation Accident | 4 | 2 | 3 | 3 | 1 | 11 |
| Urban Fire/Structure Collapse | 2 | 2 | 2 | 2 | 1 | 7 |
| Wildland Fire | 2 | 2 | 2 | 4 | 2 | 8 |
| Windstorm | 2 | 3 | 3 | 3 | 1 | 13 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|---|
| Impact | 1 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock. • Some people get sick each year, possible death |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 2 | <ul style="list-style-type: none"> • Due to standing water possible increase in the West Nile virus cases and mosquito problems • Two abandoned properties can lead to rodent infestation • City mows most lawns and keeps vegetation under control |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are no people under the age of 20, and six people over the age of 65 in the city representing 50.0 percent of the total population and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: All retired population – average population is 60 • More vulnerable: Abandoned properties, can lead to rodent infestation • More vulnerable: Abandoned vehicles |
| Capability | 1 | <ul style="list-style-type: none"> • No clinic or hospital, no ambulance • Internet connections, TV, etc. • No stockpile of medical supplies |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Pillsbury.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Lower water supplies |
| Frequency | 2 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length • In 2013, dry conditions for June to October - little to no rain. |
| Likelihood | 3 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable. • Not a lot of drain tile in the area thus far – could lead to issues |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: High senior population • More vulnerable: Abandoned buildings may result in fires • More vulnerable: Abandoned vehicles |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Sloughs by railroad tracks-never mowed and could become start and spread if the wind is right |
| Capability | 2 | <ul style="list-style-type: none"> • Water from Dakota Water Users-offices in Finley, wells in Hannaford. • No equipment to move water • Individual wells |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads in the city • Long-term health risks due to mold and disease from standing water • Increased mosquitos-many transmit disease • Basement have become flooded-all basements in town are in bad shape |
| Frequency | 3 | <ul style="list-style-type: none"> • When raining heavy, roads become blocked and is expected • Each year it occurs • Sump pumps are constantly running |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Heavy rains each year • Drainage of farmland may increase likelihood • Due to lack of storm water system, is likely in the future • Drainage ditch currently not in use • High water table |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Abandoned buildings • More vulnerable: Abandoned cars • More vulnerable: High elderly population • More vulnerable: Individual septic systems • More vulnerable: High water table |
| Capability | 2 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • Fire department has equipment to pump water, somewhat effective • Barnes County Water District and Dakota Water Users • Sump pumps • Has drainage ditch, but is currently blocked |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Pillsbury.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility |
| Frequency | 2 | <ul style="list-style-type: none"> • Never has any occurrences |
| Likelihood | 4 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • Trucks transporting equipment have larger tanks, carrying more chemicals • More oil trains coming through, railroad busy in general with material. Scored 4 because of the RR by itself. Average of 20-minute frequency, around 50+ trains per day. • Anhydrous plant closed and no longer in town • Fertilizer plant being built by Arthur Companies right on north side of 26th, just south of town |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area, new tower north of the town • More vulnerable: Railroad right through the city – bisects the city, Highway 32 somewhat • More vulnerable: High senior population |
| Capability | 1 | <ul style="list-style-type: none"> • No stockpile of medical supplies • Covered by Barnes County Ambulance • Covered by Hope Ambulance |

Homeland Security Incident

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.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss population |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 2 | <ul style="list-style-type: none"> • No major employers besides the grain elevator |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Right off major transportation rough-easy evacuation • More vulnerable: High senior population |
| Capability | 1 | <ul style="list-style-type: none"> • Sheriff’s department - Barnes • Fire department – Hope • No buildings for communal gatherings |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Lightning strike could cause a fire to buildings • Abandoned buildings could collapse, blown over • Loss of life, injury • Overland flooding of streets from heavy rain on southeast side near park • Cars become stalled • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings • Possible displacement of an estimated two people based on an average household size of 0.63 people and two mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Heavy rain from time to time • No much hail recently • Hail four miles south in 2014 • Couple high winds and strong storms per summer season |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of storm water drain • Heavier rains in recent years, more intense rain. More of a downpour than slow and steady |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are no people under the age of 20, and six people over the age of 65 in the city representing 50.0 percent of the total population, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population • More vulnerable: Roads can become blocked-heavy rains • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower |
| Capability | 1 | <ul style="list-style-type: none"> • No inert landfill for debris – contract through Brager in Sibley • Fire department has equipment • Has not adopted building codes |

Severe Winter Weather

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

| | | |
|------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal • Possible displacement of an estimated two people based on an average household size of 0.63 people and two mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • High winds and ground blizzard conditions-always blocks roads to Highway 32 • 4 to 5 times a winter with strong storms |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future • Removal of shelter belts and vegetation leads to more ground blizzard conditions |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are no people under the age of 20, and six people over the age of 65 in the city representing 50.0 percent of the total population and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population • More vulnerable: Some trailer homes, abandoned buildings, abandoned vehicles • More vulnerable: Lack of paved streets • More vulnerable: 3rd avenue becomes blocked each storm • More vulnerable: Trains stop to let others pass, can block the access to town |
| Capability | 1 | <ul style="list-style-type: none"> • Local residents do snow removal • Some residents have alternative sources of heat • No shelter • No building codes |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Long periods of time could lead to loss of life • Power outages • Senior population impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water, limited sanitary sewer • Costly to the city to take care of the issue |
| Frequency | 2 | <ul style="list-style-type: none"> • Some blocked roads during winter months up to a day, couple times during the season • Power outages-somewhat |
| Likelihood | 2 | <ul style="list-style-type: none"> • Roads become blocked and are difficult to maintain-residents have equipment • Each resident has their own generator • Clearing of street is hired out to a local resident |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No grocery • More vulnerable: No gas station • Less vulnerable: Some people grow local food supply – few • More vulnerable: High senior population • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • Less vulnerable: Some people grow local food supply – few • Less vulnerable: Local bar has a restaurant and some food |
| Capability | 2 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • Fire department has equipment • Small size of community: people willing to help out, come together |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles • Explosions from oil cars – mass casualties |
| Frequency | 2 | <ul style="list-style-type: none"> • Nothing major in the area in recent years • People were hit in the past, but arms installed in 1980s • Derailments with trains-smaller with a few RR cars |
| Likelihood | 3 | <ul style="list-style-type: none"> • Increased oil train traffic • Trains are stopped for days at a time to allow passing • Possible closing of second cross may limit access |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Senior population does drive well • More vulnerable: Lack of paved streets-soggy roads, pot holes |
| Capability | 1 | <ul style="list-style-type: none"> • No clinic or local ambulance • Medical supplies in stock • People have large trucks, tractors, equipment-farmers mostly • Cell phones for immediate calls for help |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings |
| Frequency | 2 | <ul style="list-style-type: none"> • No recent fires in memory |
| Likelihood | 2 | <ul style="list-style-type: none"> • Presence of abandoned buildings and absentee owners, deteriorating, more susceptible to fire • Old electrical wiring of homes are not in service, some aren't wired |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Senior population • More vulnerable: Abandoned properties are vulnerable areas, vehicles |

| | | |
|-------------------|---|---|
| | | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing-residents will take them in however • More vulnerable: Limited communication with fire department for alerting of an incident • More vulnerable: CRP at the church near the railroad - big slough and drainage ditch • More vulnerable: No back up water supply |
| Capability | 1 | <ul style="list-style-type: none"> • Fire department with truck and equipment • No building codes |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers do controlled burns with 10% becoming out of control • 2 or 3 out of control |
| Likelihood | 2 | <ul style="list-style-type: none"> • Continue to have controlled burns • Lack of fire break around the city • Dry conditions each year for a couple weeks. Strong winds. • CRP by the railroad, still near the church-one field |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Lack of manpower • More vulnerable: Windy conditions each year • More vulnerable: Elderly population need help with evacuation • More vulnerable: Trailer homes • More vulnerable: Lack of fire break • More vulnerable: CRP near railroad and church, near highway as well, circles the city • More vulnerable: Indoor smoking ban may lead to more fires if people kick butts |
| Capability | 2 | <ul style="list-style-type: none"> • No building codes • Mutual aid agreements are not signed • No man power • Fire department with equipment |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Topped trees become uprooted. • Abandoned buildings could topple • Loss of life, injury • Loss of crop and livestock • Loss of power • Could start a fire • Has moved train cars off the tracks • Possible displacement of an estimated two people based on an average household size of 0.63 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions |
| Likelihood | 3 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly • Cyclical weather patterns could increase or decrease |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are no people under the age of 20, and six people over the age of 65 in the city representing 50.0 percent of the total population and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population • More vulnerable: Abandoned structures and vehicles • More vulnerable: Power lines in town not buried • More vulnerable: No shelters • More vulnerable: Older homes • More vulnerable: Trailer homes |
| Capability | 1 | <ul style="list-style-type: none"> • No building codes • No inert landfill • Residents that have equipment for cleanup • Fire department has equipment • Lack of manpower |

8.8.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Pillsbury.

Problem Statement

Severe winter weather produces heavy snow that blocks roads and results in overland flooding and drainage issues in the spring in the city of Pillsbury. With a high number of abandoned structures and trailer homes, and a high elderly population, the city is vulnerable to windstorms. Windstorms are a common occurrence in the city. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of an upgraded emergency siren and construction of a shelter are a priority for the city.

City of Pillsbury Project 1: Upgrade existing drainage ditches in the city to reduce/eliminate occurrences of overland flooding.

| | |
|--------------------------|--|
| Description/Benefit | Reduction of damage to critical facilities and infrastructure from annual flooding to assure access for emergency services and continued operation of public infrastructure. Reduce or eliminate damage to people’s homes. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Pillsbury |
| Project Status | New |
| Priority | High |
| Responsible Agency | Pillsbury City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | 1 to 3 years |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 3 | 5 | 5 | 33 |

City of Pillsbury Project 2: Install warning system.

| | |
|--------------------------|---|
| Description/Benefit | Install updated county-dispatch-activated siren. The siren provides warning for people to take shelter from approaching storms. |
| Hazards Addressed | Fire, Severe Summer Weather, Windstorm |
| Affected Jurisdictions | City of Pillsbury |
| Project Status | New |
| Priority | High |
| Responsible Agency | Pillsbury City Council, Barnes County Emergency Manager |
| Partners | Barnes County Commission, fire departments and districts |
| Timeframe for Completion | 1 to 3 years |
| Cost | \$7,500 per siren |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Pillsbury Project 3: Construct storm shelter.

| | |
|--------------------------|--|
| Description/Benefit | To reduce or eliminate injury and death from severe weather. |
| Hazards Addressed | Flood, Severe Summer Weather, Severe Winter Weather, Fire, Windstorm |
| Affected Jurisdictions | City of Pillsbury |
| Project Status | New |
| Priority | High |
| Responsible Agency | Pillsbury City Council, Barnes County Emergency Manager, Barnes County Commission |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council, NDDDES, Red Cross |
| Timeframe for Completion | 3 to 5 years |
| Cost | Up to \$75,000 |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 4 | 5 | 5 | 5 | 5 | 33 |

8.8.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Pillsbury with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Pillsbury.

The city of Pillsbury has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer, but contracts when services are needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services. The city conducts graveling of city streets every two-to-three years and mows city and vacant lots. The city is part of the county-wide mutual aid agreement for emergency services. The city, however, is part of the Hope Fire Department, which is headquartered in neighboring Steele County. The city does not have an emergency siren or generators. The fire ISO rating for the city is unknown. The city does not have a fire index sign. It is unknown if emergency services are GIS capable or if hazard data is reported to the emergency manager. It is unknown if the city is Firewise or StormReady Certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Pillsbury.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. The city does not have any entities providing public education on hazards, but has access to the NDSU/Barnes County Extension

Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Pillsbury.

The city does not set aside tax revenue for capital improvements, but does maintain a savings account, which can be used if necessary. The city does not have storm water utility fee as it lacks a storm water system. The city special assesses \$10 per month for maintenance of the sanitary sewer system. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits through the county. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Pillsbury.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning, subdivision ordinances or impact fees. The city issues building permits through the county. The city council serves as the planning commission for the city. The city does not have building codes and does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

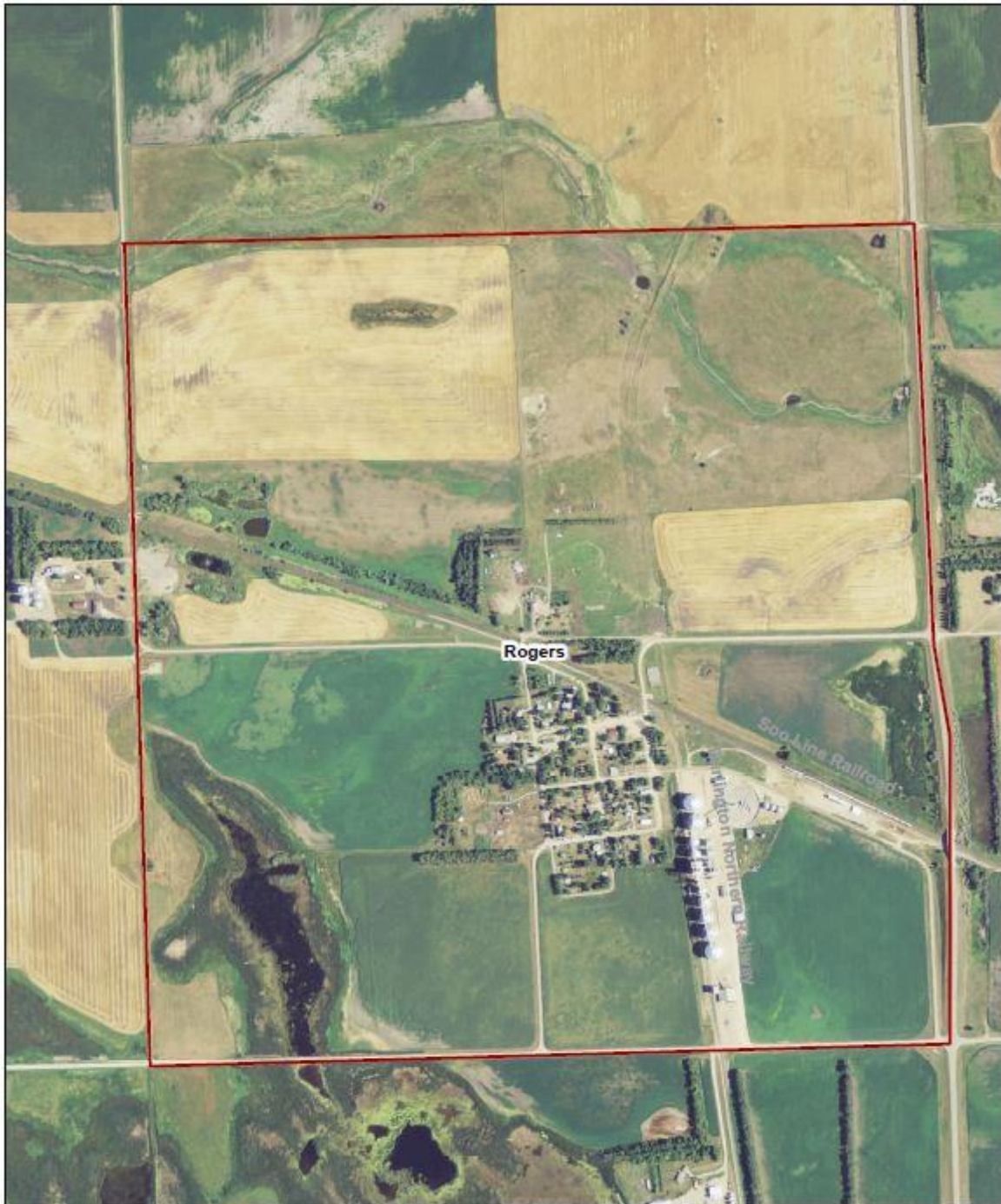
Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.9 City of Rogers

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.9.1, 8.9.2, 8.9.3, and 8.9.4. Figure 8.9.1 shows an aerial view of the city of Rogers with the city limits.

Figure 8.9.1 – City of Rogers



Source: Barnes County Emergency Management

8.9.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Rogers. Detailed narratives follow each section heading to profile the city. Additional information on the city of Rogers and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Rogers is located on N.D. State Highway 1, approximately 10 miles north-northwest of Valley City in Barnes County.

Population

The population is 46 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Rogers consists of 13 individuals under the age of 20, and 10 individuals over the age of 65, representing 28.3 percent and 21.7 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 31 housing units in the city consisting of 29 single-family homes, two mobile homes, and no multifamily homes.

Services Provided

The city of Rogers obtains potable water from Barnes Rural Water District. The city does not have a sanitary sewer system or lagoon. City residents maintain septic systems. The city does not have a storm water system. There are no lift stations in the city as it does not have a sanitary sewer system. Dakota Sanitation provides garbage services. The city does not maintain an official inert landfill, but disposes of inert debris at the former softball diamond on the north side of the city. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Rogers has a post office and maintains a park with playground equipment, grassy areas and bathroom. The city does not have a city hall, community center, city shop, county shop, library, armory, school, swimming pool, airport or golf course. The fire hall serves as the storm shelter. There are no county or state government buildings in the city. There are 29 single-family homes, no multifamily units and two mobile homes in the city of Rogers as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Rogers Volunteer Fire Department and District provides fire protection to the city and surrounding area. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Rogers. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.9.2 Risk Assessment and Hazard Scoring Notes

Table 8.9.2 summarizes the risk assessment scoring of the city of Rogers. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.9.2.

Table 8.9.2 – City of Rogers Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Rogers | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 1 | 2 | 3 | 3 | 1 | 8 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 2 | 2 | 3 | 1 | 10 |
| Flood | 3 | 3 | 4 | 3 | 1 | 12 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 3 | 1 | 1 | 9 |
| Homeland Security Incident | 2 | 2 | 2 | 3 | 1 | 8 |
| Severe Summer Weather | 4 | 3 | 3 | 3 | 2 | 11 |
| Severe Winter Weather | 3 | 3 | 4 | 4 | 2 | 12 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 3 | 3 | 3 | 2 | 10 |
| Transportation Accident | 3 | 2 | 4 | 4 | 1 | 12 |
| Urban Fire/Structure Collapse | 3 | 2 | 2 | 3 | 1 | 9 |
| Wildland Fire | 3 | 3 | 4 | 2 | 2 | 10 |
| Windstorm | 4 | 2 | 3 | 3 | 2 | 10 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|--|
| Impact | 1 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock. • Some people get sick each year, possible death |
| Frequency | 2 | <ul style="list-style-type: none"> • People get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 3 | <ul style="list-style-type: none"> • Due to standing water possible increase in the West Nile virus cases and mosquito problems • Abandoned properties can lead to rodent infestation • Individuals mows most lawns and keeps vegetation under control • City is in a low-lying area and standing water is a problem • Mosquitos are a big problem |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Retired population, elderly, and many children • More vulnerable: Abandoned properties, can lead to rodent infestation • More vulnerable: Abandoned vehicles • More vulnerable: City is in a low-lying area and standing water is a problem |
| Capability | 1 | <ul style="list-style-type: none"> • No clinic or hospital, county ambulance • No First responders • Internet connections, TV, etc. • No stockpile of medical supplies • Fire department has equipment to move water |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Rogers.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|---------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Lower water supplies • All residents will be affected • Fire issues |
|---------------|---|---|

| | | |
|----------------------|---|---|
| Frequency | 2 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length • In 2013, dry conditions for June to October |
| Likelihood | 2 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable. • Not a lot of drain tile in the area thus far – could lead to issues, some has been done |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: High senior population, many children and families • More vulnerable: Abandoned buildings may result in fires • More vulnerable: Abandoned vehicles • Barnes Rural Water District • Less vulnerable: Fire Dept. has equipment to move water • Less vulnerable: Farmers have wells • Less vulnerable: Elevator has two large tanks for water storage-200,000 each |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Limited administrative and city staff • Lack of water conservation plan |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads in the city • Long-term health risks due to mold and disease from standing water • Increased mosquitos-many transmit disease • Basement have become flooded-most have a lot of moisture, sump pumps |
| Frequency | 3 | <ul style="list-style-type: none"> • When raining heavy, roads become blocked and is expected • Each year it occurs sometimes multiple • Sump pumps are constantly running on a wet year • 3 to 4 times each year water is blocking roads • Can come down in 4 to 5 inches at once |
| Likelihood | 4 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • No drainage ditches • High water table • Culvert has storm gate/grate/screen to catch debris, but is too high |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Abandoned buildings • More vulnerable: Near old gas pump water accumulates on 1st street • More vulnerable: Abandoned cars • More vulnerable: High elderly population, families with children • More vulnerable: No storm system or drainage ditch • More vulnerable: High water table |
| Capability | 1 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • Fire department has equipment to pump water, somewhat effective • Barnes County Water District • Sump pumps |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Rogers.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops, livestock and economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility • Loss of railroad service • Small size of city-everyone would be impacted |
| Frequency | 2 | <ul style="list-style-type: none"> • No history of incidents |
| Likelihood | 3 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • Trucks transporting equipment have larger tanks carrying chemicals • Anhydrous and other chemicals at Benson-Quinn • Railroad transports chemicals • Located on highways or truck routes |
| Vulnerability | 1 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area, new tower north of the town, landlines, internet • More vulnerable: People are not signed up for Code Red-most don't know • More vulnerable: High senior population and families with kids |
| Capability | 1 | <ul style="list-style-type: none"> • No stockpile of medical supplies • Fire department has first aid kit at the Fire Hall • No clinic or hospital • Covered by Barnes County Ambulance • Benson Quinn has two individuals in charge of safety meetings |

Homeland Security Incident

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.

| | | |
|----------------------|---|--|
| Impact | 2 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss of population |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 2 | <ul style="list-style-type: none"> • No major employers besides Benson Quinn |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Right off major transportation rough-easy evacuation • More vulnerable: High senior population, children and families |
| Capability | 1 | <ul style="list-style-type: none"> • Sheriff's department - Barnes • Fire department – has some equipment that can be used |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Lighting strike could cause a fire to buildings • Abandoned buildings could collapse, blown over • Loss of life, injury • Overland flooding of streets from heavy rain • Cars become stalled • Streets can become soggy from moisture-not all streets are paved • Straight-line winds can cause damage to buildings • Chemicals tanks were blown over • Possible displacement of an estimated three people based on an average household size of 1.48 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain from time to time each summer • No much hail recently • Couple high winds and strong storms per summer season • Straight line winds about 6 to 7 years ago-lots of trees blew down |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of storm water drain or system • Heavier rains in recent years, more intense rain. More of a downpour than slow and steady. |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population, children and families • More vulnerable: City park-overland flooding from heavy rain • More vulnerable: Corner of 1st by the old gas pump. • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower • More vulnerable: No building codes • More vulnerable: No public shelter |
| Capability | 2 | <ul style="list-style-type: none"> • No inert landfill for debris – contract through Dakota Sanitation • Fire department has equipment • Has not adopted building codes • Small community-independent in nature, people help out • As needed maintenance by city • Mayor takes debris to old baseball diamond |

Severe Winter Weather

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

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal • Icy roads – accidents can occur • Possible displacement of an estimated three people based on an average household size of 1.48 people and two mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area • High winds and ground blizzard conditions-always blocks roads to Highway 1 • 4 to 5 times a winter with strong storms |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future • Removal of shelter belts and vegetation leads to more ground blizzard conditions-happening outside of town but nowhere near city limits |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population, children and families • More vulnerable: Abandoned buildings, abandoned vehicles • More vulnerable: Lack of paved streets • More vulnerable: People view this as normal, are used to it, part of everyday life • More vulnerable: No grocery store or gas station, or clinic |
| Capability | 2 | <ul style="list-style-type: none"> • Local residents do snow removal, County Road 10 does the highway, ND Highway 1 north and south • Some residents have alternative sources of heat • shelters (unofficial) • No building codes |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|---------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time could lead to loss of life • Power outages • Downed power lines • Senior population impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water |
|---------------|---|---|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Loss of sanitary sewer from septic tanks from loss of power |
| Frequency | 3 | <ul style="list-style-type: none"> • Some blocked roads during winter months up to a day, couple times during the season • March of 1997-whole county was out for 3 days up to a week-out for 2 weeks in Rogers |
| Likelihood | 3 | <ul style="list-style-type: none"> • Roads become blocked -residents have equipment for clearance • Clearing of street is done by local resident |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No full-service grocery or gas station • More vulnerable: High senior population, children with families • More vulnerable: Long response time for ambulance, police. Fire department could have some mobility issues • Less vulnerable: Some people grow local food supply – few |
| Capability | 2 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • Fire department has equipment for pumping water • Small size of community: people willing to help out, come together |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles • Blocked roads • Benson and Quinn could lose functionality for a period of time • Explosions from oil trains |
| Frequency | 2 | <ul style="list-style-type: none"> • Nothing major in the area in recent years |
| Likelihood | 4 | <ul style="list-style-type: none"> • City not located on major highway, but located on State Highway • Lots of truck traffic, lots of anhydrous being transported • Lots of potatoes being hauled to Cavendish, lots of traffic • Little traffic-small town • Oil trains going through the area. Also propane and other chemicals. • Lack of armed crossings |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Senior population does drive • More vulnerable: Lack of paved streets-soggy roads, pot holes • More vulnerable: Railroad without armed crossings |
| Capability | 1 | <ul style="list-style-type: none"> • No clinic or local ambulance • No Medical supplies and AED, No first responders • People have large trucks, tractors, equipment-farmers mostly • Cell phones for immediate calls for help |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings • Loss of jobs at the elevator |
| Frequency | 2 | <ul style="list-style-type: none"> • No recent fires in memory • Elevator fire in 2013, two fires, nothing serious, grain dryer fire, grain leg burned as well |
| Likelihood | 2 | <ul style="list-style-type: none"> • Presence of abandoned buildings and absentee owners, deteriorating, more susceptible to fire • Old electrical wiring of homes-people shouldn't be living there |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Senior population, children and families • More vulnerable: Abandoned properties are vulnerable areas, vehicles • More vulnerable: Lack of alternative housing-residents will take them in however • More vulnerable: Good communication with fire department for alerting of an incident • More vulnerable: Back up water supply of at the elevator if needed, 400,000 gallons total at times |
| Capability | 1 | <ul style="list-style-type: none"> • Fire department with truck and equipment • No building codes |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 3 | <ul style="list-style-type: none"> • Farmers do controlled burns, 40% become out of control |
| Likelihood | 4 | <ul style="list-style-type: none"> • Continue to have controlled burns • Lack of fire break around the city but does have rows of trees • Dry conditions each year for a couple weeks. Strong winds. |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Windy conditions each year • More vulnerable: Fire department has equipment and personnel • More vulnerable: Elderly population need help with evacuation • More vulnerable: Trailer homes • More vulnerable: Lack of fire break but has trees around the city • More vulnerable: No vulnerable areas in city limits • More vulnerable: No official shelter • More vulnerable: Lack of alternative housing options |

| | | |
|-------------------|---|---|
| | | <ul style="list-style-type: none"> • Less vulnerable: Less CRP in the area |
| Capability | 2 | <ul style="list-style-type: none"> • No building codes • Mutual aid agreements are signed • Little man power on city level • Fire department with equipment • Benson Quinn has water hauling equipment |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Abandoned buildings could topple • Loss of life, injury. • Loss of crop and livestock • Loss of power • Could start a fire • Possible displacement of an estimated three people based on an average household size of 1.48 people and two mobile home structures |
| Frequency | 2 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Usually a summer thing |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy trees around city limits. • Cyclical weather patterns could increase or decrease • Removal of shelter belt. |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 35 people under the age of 20 and 12 people over the age of 65 in the city representing 30.0 percent and 10.2 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Senior population, families with children • More vulnerable: Abandoned structures and vehicles • More vulnerable: Power lines in town not buried • More vulnerable: No official shelters, fire hall • More vulnerable: Older homes • More vulnerable: Trailer homes |
| Capability | 2 | <ul style="list-style-type: none"> • No building codes • No inert landfill • Residents that have equipment for cleanup • Fire department has equipment • Lack of manpower at the city level • Farmers help out, move debris, etc. • Maintenance done on an as needed basis by the city |

8.9.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Rogers.

Problem Statement

The city of Rogers experiences overland flooding from severe summer and winter weather. The city also has poor drainage, lacks a storm water drainage system and has a high water table. Blocked roads from standing water are common. The lack of grade-separated railroad crossings is problematic with the increase in train traffic through the city due to energy development in the western part of the state. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of backup power for critical facilities and infrastructure, and improvements to the transportation system are a priority for the city.

City of Rogers Project 1: Establish permanent drainage for the city park and other low-lying areas to reduce/eliminate occurrences of overland flooding.

| | |
|--------------------------|--|
| Description/Benefit | Reduction of damage to critical facilities and infrastructure from annual flooding to assure access for emergency services and continued operation of public infrastructure. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Rogers |
| Project Status | New |
| Priority | High |
| Responsible Agency | Rogers City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 3 | 3 | 5 | 1 | 27 |

City of Rogers Project 2: Install generators for the city lift station and fire hall.

| | |
|--------------------------|---|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system to ensure resiliency. To maintain continued operation of the fire hall and emergency siren. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Rogers |
| Project Status | New |
| Priority | High |
| Responsible Agency | Rogers City Council, Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state, federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Rogers Project 3: Grade separate roads and highways from railroad crossings and/or install crossing arms.

| | |
|--------------------------|---|
| Description/Benefit | Maintain access for emergency services and assure county-wide communication of accessibility. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Rogers |
| Project Status | New |
| Priority | High |
| Responsible Agency | Barnes County Highway Department Superintendent, Rogers Township Board |
| Partners | County, emergency agencies (ambulance, fire, police) engineering firms, soil conservation, |
| Timeframe for Completion | 10 to 20 years |
| Cost | Project specific |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 2 | 3 | 3 | 3 | 5 | 25 |

8.9.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Rogers with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Rogers.

The city of Rogers has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer, but can contract with a private firm when services are needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services. However, the city council and auditor have administration capabilities. Infrastructure maintenance is conducted on an as-needed basis. The city is part of the county-wide mutual aid agreement for emergency services. The city also has signed mutual aid agreements specifically with Dazey, Sanborn, Valley City and Wimbledon for fire protection. The city has two emergency sirens with both located at the fire hall and one being manually activated and the other activated by county dispatch. The city does not have any generators. The fire ISO rating for the city is 10. The city does not have a fire index sign. Emergency services are not GIS capable. The fire chief and assistant fire chief report hazard data to the emergency manager. The city is not Firewise or StormReady Certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Rogers.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city

and therefore no school programs targeting hazard education are available. Adam Benson-Quinn conducts hazard education, safety drills and precaution workshops for employees, but not the general public. The city also has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Rogers.

The city does not set aside tax revenue for capital improvements and only has a general fund. The city does not have storm water utility fee as it lacks a storm water system. The city does not charge a sanitary sewer fee despite having a sanitary sewer system. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits. The city has access to CDBG funds through the SCDRC. The Adam Benson-Quinn elevator provides funding to the city when needed, which can potentially be used for mitigation purposes. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Rogers.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city does not have zoning, subdivision ordinances or impact fees. The city issues building permits for \$5. The city council serves as the planning commission for the city. The city does not have building codes and does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.10 City of Sanborn

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.10.1, 8.10.2, 8.10.3, and 8.10.4. Figure 8.10.1 shows an aerial view of the city of Sanborn with the city limits.

Figure 8.10.1 – City of Sanborn



Source: Barnes County Emergency Management

8.10.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Sanborn. Detailed narratives follow each section heading to profile the city. Additional information on the city of Sanborn and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Sanborn is located near the intersection of N.D. Highway 1 and Interstate 94, approximately 11 west of Valley City in Barnes County.

Population

The population is 192 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Sanborn consists of 56 individuals under the age of 20, and 22 individuals over the age of 65, representing 29.2 percent and 11.5 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 93 housing units in the city consisting of 84 single-family homes, nine mobile homes, and no multifamily homes.

Services Provided

The city of Sanborn obtains potable water from Barnes Rural Water District. There are no septic systems in city limits. The city has a sanitary sewer system, lagoon and lift station. The city does not have a storm water system. Sanitation Specialists provides garbage services. The city maintains an inert landfill located east of the city. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Sanborn has a post office and maintains a park with playground equipment, outhouse, basketball court, and volleyball court. The city has a city hall/community center and city shop. The city does not have a county shop, library, armory, school, swimming pool, airport or golf course. The fire hall, community center and Sacred Heart Catholic Church serves as the storm shelter. There are no county or state government buildings in the city. There are 84 single-family homes, no multifamily units and nine mobile homes in the city of Sanborn as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Sanborn Volunteer Fire Department provides fire protection to the city and the Sanborn Rural Fire Protection District provides fire protection to the surrounding area. The fire department and

district share a fire hall. The city has 18 first responders, which are based in the fire hall. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. MDU provides natural gas to the city. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.10.2 Risk Assessment and Hazard Scoring Notes

Table 8.10.2 summarizes the risk assessment scoring of the city of Sanborn. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.10.2.

Table 8.10.2 – City of Sanborn Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Sanborn | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 2 | 3 | 3 | 1 | 11 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 1 | 2 | 2 | 1 | 8 |
| Flood | 4 | 3 | 3 | 2 | 1 | 11 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 4 | 1 | 13 |
| Homeland Security Incident | 4 | 1 | 2 | 4 | 1 | 10 |
| Severe Summer Weather | 4 | 2 | 4 | 3 | 1 | 12 |
| Severe Winter Weather | 4 | 3 | 4 | 3 | 1 | 13 |
| Shortage or Outage of Critical Materials or Infrastructure | 4 | 4 | 4 | 3 | 1 | 14 |
| Transportation Accident | 4 | 2 | 4 | 4 | 1 | 13 |
| Urban Fire/Structure Collapse | 2 | 2 | 3 | 4 | 3 | 8 |
| Wildland Fire | 3 | 2 | 3 | 3 | 3 | 8 |
| Windstorm | 4 | 3 | 3 | 3 | 2 | 11 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of economy from crops and/or livestock loss • Residents get sick each year • Always a possibility of human death • Due to small size of city an outbreak would spread quickly and affect large numbers of city residents |
| Frequency | 2 | <ul style="list-style-type: none"> • Some people get sick each year • Crop loss and localized livestock loss occurs each year |
| Likelihood | 3 | <ul style="list-style-type: none"> • Installation of new culverts reduces standing water • Small size of community and low population limits the odds of outbreak • Residents mow most lawns and keeps vegetation under control • Standing water on the west side of town on private residence provides habitat for mosquitos • Presence of city resident collecting and storing cars and other expended materials in city limits |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 56 people under the age of 20 and 55 people over the age of 65 in the city representing 29.2 percent and 11.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: High elderly population • More vulnerable: Roughly 40 children under the age of 18 in town • More vulnerable: Some abandoned buildings in town • More vulnerable: No resources such an ambulance, hospital or clinic • More vulnerable: Medical supplies in stock at fire hall and at homes of first responders • More vulnerable: Internet connections and TV help inform residents of best methods for prevention • More vulnerable: Standing water on the west side of town on private residence provides habitat for mosquitos • Less vulnerable: Residents mow most lawns and keeps vegetation under control |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Sanborn.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of crop, livestock, economic activity and jobs • Casualties possible • Increased risk to buildings from fire hazards • Higher cost to cool homes resulting in increased utilities • Lower water supplies may lead to water shortages • Impacts locally-grown food supplies as water shortages may occur • Local economy heavily dependent on agriculture |
| Frequency | 1 | <ul style="list-style-type: none"> • Severe drought in 1988 • Some dry conditions each year lasting a couple weeks in length • In 2013 and 2014, dry conditions lasted for June to October |
| Likelihood | 2 | <ul style="list-style-type: none"> • Weather patterns are cyclical and unpredictable • No drain tile in the area • Little irrigation in and around the area decreases likelihood of water resource depletion • City water is provided by Barnes Rural Water District and decreases likelihood of impacts • High water content in the soil and high water table decreases likelihood of severe drought |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: City is completely dependent on the water district • More vulnerable: High elderly population • More vulnerable: Abandoned structures are vulnerable to fire potential from dry conditions • Less vulnerable: Fire department has 10,000-gallon fire truck and equipment for moving of water • Less vulnerable: City has water tower for backup water supply • Less vulnerable: Water is provided by Barnes Rural Water District • Lack of individual wells can decrease and increase vulnerability |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Blocked roads • Increased mosquito and transmitting of diseases from standing water • Basements have become flooded • Residents have sump pumps running 24/7 • Large loss of property, vehicles, personal property • Some casualties are possible • Residents may miss work from flooding of basements or damage to personal property resulting in loss of economy • Loss of phone and internet service due to flooding of ICTC operations building located near train tracks • Loss of freight railroad service due to filling up of Sanborn Lake, which may result in a state-wide loss of economy • Loss of access in and out of the city due to flooding of roadways |
| Frequency | 3 | <ul style="list-style-type: none"> • Only happens when a lot of rain falls or snow in the winter • Depends largely on weather patterns • Large snow melt in spring of 2009, 2010 and 2011 resulted in overland flooding of city streets |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Lack of storm water system in the city for drainage • High water table • No drain tile in the area may increase amount of standing water • Topography does not allow swift drainage of precipitation, snow melt, standing water, etc. |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: High elderly population • More vulnerable: Lack storm water system for drainage • More vulnerable: City lacks equipment and infrastructure to address flooding • Less vulnerable: Extensive manpower provided by the fire department • Less vulnerable: Fire department has equipment to pump standing water • Less vulnerable: Installation of new culverts decreases amount of standing water |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Fire department has portable pumps and extensive manpower • Lacks resources to accomplish projects independently |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Sanborn.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked roads leading to loss of transportation mobility • Blocked roads could result in temporary isolation and shortage or outage of critical materials or infrastructure • Small size of city could lead to large losses of property and people • Could result in explosion and destruction of buildings from trains carrying hazardous chemicals and oil shipments |
| Frequency | 2 | <ul style="list-style-type: none"> • Never had any major occurrences or incidences • Anhydrous station south of city experienced valve deterioration on main supply tank |
| Likelihood | 4 | <ul style="list-style-type: none"> • Propane is used for heating alternative some a few residences • Anhydrous stored in tanks in city limits on south side of railroad tracks • Railroad hauling chemicals and oil through city limits has increased astronomically since 2010 • Presence of side track allows parking of freight trails increases amount of hazardous material temporarily stored in city limits • Natural gas availability as heating source decreases propane and alternative fuel sources • Construction of CHS nitrogen fertilizer plant will increase likelihood of a release |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Anhydrous ammonia fill station located results in truck traffic hauling chemicals in and out of city limits • More vulnerable: High elderly population • More vulnerable: Small size of city would leave all residents impacted • More vulnerable: Limited traffic control signage and enforcement on Barnes County Road 11 and 22 • More vulnerable: Medical supplies in stock at fire hall and at homes of first responders • More vulnerable: Covered by Barnes County Ambulance, but may result in prolonged response times • More vulnerable: Lacks hazardous material route • More vulnerable: Presence of side track allows parking of freight trails increases amount of hazardous material temporarily stored in city limits • Less vulnerable: Cell phone service in the area is reliable |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council |

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |
|--|--|---|

Homeland Security Incident

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.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Mass casualties, economic losses, and widespread panic • Potential for population loss if incident occurred • Small size of city could lead to large losses of property and people |
| Frequency | 1 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 2 | <ul style="list-style-type: none"> • Presence of the anhydrous ammonia fill station • No school in the city • No dense or large population in the area |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: High elderly population • More vulnerable: High population of school-aged children • More vulnerable: Railroad line and side track through city limits • More vulnerable: Community hall and fire hall for gathering of residents • More vulnerable: Lack of law enforcement in the city results in prolonged response time from Barnes County Sheriff • Less vulnerable: Right off Interstate 94 and county roads, which can be used as evacuation routes • Less vulnerable: 18 first responders living in and around the city |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|---------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Damage to homes and community buildings from hail, broken windows, loss of shingles, fallen tree debris • Power outages • Lightning strike could cause a fire to buildings • Potential injury and loss of life • Potential loss of livestock and economy • Cars become stalled due to high water • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings |
|---------------|---|--|

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Small size of city limits impacted areas and populations • Severe storms can potentially destroy majority of structures in the city • Large financial impact to local economy as it is heavily reliant on agriculture • Drivers become stuck in potholes and mud on city streets • Possible displacement of an estimated 18 people based on an average household size of 2.06 people and nine mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain from time to time during summer months • Around two-to-three high winds and strong storms per summer season • Each year structures experience damage to shingles • Each year tree branches fall and damage structures |
| Likelihood | 4 | <ul style="list-style-type: none"> • Lacks storm water drainage system • Heavy rains in recent years • Climatic patterns of the area will result in several storms per year |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 56 people under the age of 20 and 55 people over the age of 65 in the city representing 29.2 percent and 11.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Lack of paved streets • More vulnerable: Lack of storm drainage system • More vulnerable: Prolonged response times and limited access for emergency services • More vulnerable: High elderly population • More vulnerable: High school-age population • More vulnerable: Most city residents are not signed up for Code Red • More vulnerable: City has adopted build codes but lacks of enforcement • Less vulnerable: Fire department has equipment for moving of water and debris • Less vulnerable: City has inert landfill • Less vulnerable: Roads in and out of town are maintain and sufficient • Less vulnerable: City streets are in the process of being re-graveled • Less vulnerable: City has emergency siren activated by county dispatch • Less vulnerable: Large amount of manpower and volunteers on fire department • Less vulnerable: City residents have equipment and volunteer time and resources for clean up • Less vulnerable: Presence of three storm shelters |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • Has adopted state building codes but lacks enforcement |

Severe Winter Weather

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

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> Blocked roads and power outages from heavy snow Isolation of the community from blocked roads Severe low temperatures can increase utility costs Potential loss of life and injury Loss of economy Low temperatures may affect alternative fuel sources Increased cost for snow removal Highways can become icy reducing mobility speeds Heavy snow results in potential flooding in the spring City streets build up with compacted snow which limits mobility and causes damage to streets Blocked roads increases difficulty for elderly residents to travel and access necessary medical services Possible displacement of an estimated 18 people based on an average household size of 2.06 people and nine mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> Happens yearly due to weather and climate in the area High winds and ground blizzard conditions occurs each year Ice storm occurred in 1997 resulting in temporary isolation of the community |
| Likelihood | 4 | <ul style="list-style-type: none"> Will happen in the future due to the climate Removal of shelter belts and vegetation around the city leads to more ground blizzard conditions in the local area |
| Vulnerability | 3 | <ul style="list-style-type: none"> There are 56 people under the age of 20 and 55 people over the age of 65 in the city representing 29.2 percent and 11.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. More vulnerable: Lack of paved streets More vulnerable: High elderly population More vulnerable: High school-age population More vulnerable: County clears city streets More/less vulnerable: Adopted state building codes but lacks enforcement Less vulnerable: City residents have equipment and volunteer time and resources for clean up Less vulnerable: Independent, small town and good neighbors willing to help out Less vulnerable: High winds does not allow accumulation of snow on top of structures resulting in lower snow loads on roofs |
| Capability | 1 | <ul style="list-style-type: none"> Active city council Lacks technical, administrative and financial resources for mitigation Relies on county, regional, state and other agencies for assistance No active education or outreach programs Lacks resources to accomplish projects independently Has adopted state building codes but lacks enforcement |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages • Elderly individuals impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water and functionality of sanitary sewer if power outages occurred • Parking of trains on side track results in temporary isolation of the city |
| Frequency | 2 | <ul style="list-style-type: none"> • Power outages occur sparingly • Never an issue with water now that city is connected to Barnes Rural Water District • Ice storm in 1997 resulted in isolation of the community and loss of power for one week |
| Likelihood | 4 | <ul style="list-style-type: none"> • County clears county road and state clears Interstate 94 • City resident clear roads during winter months • No improvements to power infrastructure planned such as burying power lines • Increase in train traffic, which can block roadways, may increase isolation of community • Installation of new power poles through Sanborn lake |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No grocery • More vulnerable: City residents have equipment and volunteer time and resources for clean up • More vulnerable: Long response time for ambulance and police • More vulnerable: Fire department could have mobility issues from blocked roads • More vulnerable: High elderly population • More vulnerable: High school-age population • More vulnerable: Area residents and city lack equipment to clear roads and maintain infrastructure • Less vulnerable: Fire department has equipment for moving water • Less vulnerable: More vulnerable: Residents no longer maintain individual wells for potable sources • Less vulnerable: Water provided by Barnes Rural Water District • Less vulnerable: Gas station • Less vulnerable: Some residents grow local food supply • Less vulnerable: City residents have equipment and volunteer time and resources for clean up |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life and injury • Loss of economy • Loss of property such as cars and trucks • Can result in HAZMAT • Can result in fires of buildings, equipment and vehicles • Results in temporary isolation of the community from blocked roads • Increases response times for emergency services from blocked roads and may result in death of area resident |
| Frequency | 2 | <ul style="list-style-type: none"> • No major accidents in the area in recent years • Small-to-moderate traffic accident occurring roughly once per year at intersection of county roads 11 and 22 |
| Likelihood | 4 | <ul style="list-style-type: none"> • Speeding traffic through the city on county roads • Closing of elevator drastically reduced truck traffic through city limits • Adequate enforcement by County Sheriff on county roads • Closing of elevator resulted in side track now being used by trains carrying oil and chemicals, which can be parked illegally for several hours at a time |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance with response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Lack of paved streets results in soggy roads and potential accidents • More vulnerable: High elderly population • More vulnerable: High school-age population results in high risk for pedestrian accident • More vulnerable: Lack of ordinances restricting use of recreational vehicles in city limits • More vulnerable: Lack of crosswalks and sidewalks • More vulnerable: Closing of elevator resulted in side track now being used by trains carrying oil and chemicals, which can be parked illegally for several hours at a time • Less vulnerable: Adequate street signage recently improved resulting in better awareness of traffic in city limits • Less vulnerable: Medical supplies in stock at fire hall and at homes of first responders • Less vulnerable: Fire hall has truck for fire suppression and assistance in accidents • Less vulnerable: Adequate enforcement by County Sheriff on county roads |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs |

| | | |
|--|--|--|
| | | <ul style="list-style-type: none"> • Lacks resources to accomplish projects independently • Has adopted state building codes but lacks enforcement |
|--|--|--|

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Loss of community asset/buildings • Spacing of structures and residential homes limits potential spread of fire |
| Frequency | 2 | <ul style="list-style-type: none"> • No real incidents or large structure fires • Smaller fires in recent years resulting in loss of garages and sheds • Bar and motel burned down in 2002 • Bar/business in town collapsed due to explosion of substance in neighboring building in late 1990s |
| Likelihood | 3 | <ul style="list-style-type: none"> • Abandoned buildings are not well kept • Vegetation can become dry from drought and cause a building fire • City mows and maintains vegetation on city lots • Less vulnerable: City has ability to pump water from city hydrants • Less vulnerable: City maintains water tower for backup water supplies for suppression • Less vulnerable: High water table and moisture in the soil • Spacing of structures and residential homes limits potential spread of fire • Age of structures and wiring is out of date and may increase likelihood of an incident |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing for displaced residents • More vulnerable: Small size of town and spacing of residential structures reduces risk, however buildings on main street are close together and hazardous • More vulnerable: Age of fire department volunteers • More vulnerable: Abandoned buildings are not well kept • More/less vulnerable: Adopted state building codes but lacks enforcement • Less vulnerable: Fire department has trucks and equipment to move water • Less vulnerable: 18 first responders living in and around the city • Less vulnerable: Fire hall has truck for fire suppression and assistance in incidences • Less vulnerable: City has ability to pump water from city hydrants • Less vulnerable: City maintains water tower for backup water supplies for suppression • Less vulnerable: High water table and moisture in the soil • Less vulnerable: Loss of CRP near city limits • Less vulnerable: Distance from neighboring fire departments can lessen issues |
| Capability | 3 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation |

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Fire department possess equipment, fire trucks, 10,000-gallon fire semi-tanker and highly education/well trained volunteer staff • Lacks resources to accomplish projects independently • Has adopted state building codes but lacks enforcement • 18 first responders located in and around the city |
|--|--|---|

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, injury, and economy • Loss of farm equipment • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers conduct large amount of controlled burning • No reports of lightning starting fires |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of fire break around the city • Dry conditions each year for a couple weeks with strong winds • Reduction of CRP • Grassland does not surround the city • Abandoned buildings may cause a structure fire and can potentially result in a wildland fire |
| Vulnerability | 3 | <ul style="list-style-type: none"> • Less vulnerable: Short response from surrounding fire departments • More vulnerable: Windy conditions each year • More vulnerable: Lack of fire break around the city • More vulnerable: Adopted state building codes but lacks enforcement • More vulnerable: Presence of sloughs reduces mobility of fire department vehicles and limits accessibility • Less vulnerable: Reduction of CRP • Less vulnerable: Fire hall has truck for fire suppression and assistance in incidences • Less vulnerable: Short response from surrounding fire departments |
| Capability | 3 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Fire department possess equipment, fire trucks, 10,000-gallon fire semi-tanker and highly education/well trained volunteer staff • Lacks resources to accomplish projects independently • Has adopted state building codes but lacks enforcement • 18 first responders located in and around the city |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, and economy • Loss of farm equipment • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat • Possible displacement of an estimated 18 people based on an average household size of 2.06 people and nine mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Farmers conduct large amount of controlled burning • No reports of lightning starting fires |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of fire break around the city • Dry conditions each year for a couple weeks with strong winds • Reduction of CRP • Grassland does not surround the city • Abandoned buildings may cause a structure fire and can potentially result in a wildland fire |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 56 people under the age of 20 and 55 people over the age of 65 in the city representing 29.2 percent and 11.5 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Windy conditions each year • More vulnerable: Adopted state building codes but lacks enforcement • More vulnerable: Presence of sloughs reduces mobility of fire department vehicles and limits accessibility • More vulnerable: Lack of fire break around the city • Less vulnerable: Reduction of CRP • Less vulnerable: Fire hall has truck for fire suppression and assistance in incidences • Less vulnerable: Short response from surrounding fire departments |
| Capability | 2 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Fire department possess equipment, fire trucks, 10,000-gallon fire semi-tanker and highly education/well trained volunteer staff • Lacks resources to accomplish projects independently • Has adopted state building codes but lacks enforcement • 18 first responders located in and around the city |

8.10.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Sanborn.

Problem Statement

The city of Sanborn experiences overland flooding from severe summer weather and severe winter weather, impact critical facilities and infrastructure. The lack of drainage of Sanborn Lake impacts an adjacent freight railroad line and roads leading to the city. Blocked roads occur from severe winter weather and can result in isolation of the city. With a high number of abandoned structures and trailer homes, and a high elderly population, the city is vulnerable to windstorms. The city has little to no capabilities for mitigation and therefore is dependent on outside sources.

Improved drainage, installation of additional generators for backup power, burying of power lines, and construction of a storm shelter are a priority for the city.

City of Sanborn Project 1: Upgrade existing drainage to eliminate overland flooding.

| | |
|--------------------------|--|
| Description/Benefit | Reduction of damage to critical facilities and infrastructure from annual flooding to assure access for emergency services and continued operation of public infrastructure. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Sanborn |
| Project Status | Continue |
| Priority | High |
| Responsible Agency | Sanborn City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 3 | 3 | 5 | 1 | 27 |

City of Sanborn Project 2: Create and implement drainage ditch maintenance system for existing drainage ditches in the city.

| | |
|--------------------------|---|
| Description/Benefit | Maintain flow of runoff to eliminate standing water blocking roads to maintain access for city residents and emergency services and continued operation of public infrastructure. Control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Sanborn |
| Project Status | Continue |
| Priority | Medium |
| Responsible Agency | Sanborn City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 3 | 3 | 5 | 5 | 31 |

City of Sanborn Project 3: Install generators for the city lift station and fire hall.

| | |
|--------------------------|---|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system to ensure resiliency. To maintain continued operation of the fire hall and emergency siren. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Sanborn |
| Project Status | New |
| Priority | High |
| Responsible Agency | Sanborn City Council, Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state, federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Sanborn Project 4: Construct storm shelter.

| | |
|--------------------------|---|
| Description/Benefit | To reduce or eliminate injury and death from severe weather. |
| Hazards Addressed | Flood, Severe Summer Weather, Severe Winter Weather, Fire, Windstorm |
| Affected Jurisdictions | City of Sanborn |
| Project Status | New |
| Priority | High |
| Responsible Agency | Sanborn City Council, Barnes County Emergency Manager, Barnes County Commission |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council, NDDDES |
| Timeframe for Completion | 3 to 5 years |
| Cost | Up to \$75,000 |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 4 | 5 | 5 | 5 | 5 | 33 |

City of Sanborn Project 5: Bury power lines.

| | |
|--------------------------|---|
| Description/Benefit | Maintain power for critical services. |
| Hazards Addressed | Severe Summer Weather, Severe Winter Weather, Windstorm |
| Affected Jurisdictions | City of Sanborn |
| Project Status | New |
| Priority | High |
| Responsible Agency | Public Utilities: Ottertail Power Company, Federal Government, Midwest Independent System Operator (MISO) |
| Partners | Cities, count, state |
| Timeframe for Completion | Long term – 20+ years |
| Cost | Dependent on funding available for utility |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 1 | 4 | 2 | 1 | 3 | 20 |

8.10.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Sanborn with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Sanborn.

The city of Sanborn has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer, but can contract with a private firm when services are needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services. However, the county's emergency manager is a member of the city council and can write and administer grants. The city council and auditor also have administration capabilities. Infrastructure maintenance is conducted on an as-needed basis. The city is part of the county-wide mutual aid agreement for emergency services. The city has an emergency siren located at the fire hall. The city has a generator at the water tower. The fire ISO rating for the city is six. The city has a fire index sign located at the fire hall. Emergency services are not GIS capable. The fire chief and assistant fire chief report hazard data to the emergency manager. The city is not Firewise or StormReady Certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Sanborn.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. Didiers Ag Center conducts

hazard education for employees, but not the general public. The city also has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city also has an annual “smoker” event where hazard education is provided. There are no public-private partnerships providing education and outreach on hazards. The county’s emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Sanborn.

The city does not set aside tax revenue for capital improvements and only has a general fund. The city does not have storm water utility fee as it lacks a storm water system. The city does charge a monthly sanitary sewer fee which is placed on the water/sewer/garbage bill. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city issued a bond to pay for a new pump house in recent years and has the ability to incur debt through general obligation bonds or special tax bonds in the future if needed. The city issues building permits. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Sanborn.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county’s local emergency operations plan and flood management plan, and the county road department’s transportation plan. The city does not have a continuity of operations plan. The city recently updated its zoning, but does not have subdivision ordinances or impact fees. The city issues building permits for \$5. The city council serves as the planning commission for the city. The city adopted state building codes but does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County’s Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.11 City of Sibley

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.11.1, 8.11.2, 8.11.3, and 8.11.4. Figure 8.11.1 shows an aerial view of the city of Sibley with the city limits.

Figure 8.11.1 – City of Sibley



Source: Barnes County Emergency Management

8.11.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Sibley. Detailed narratives follow each section heading to profile the city. Additional information on the city of Sibley and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Sibley is located on Barnes County Highway 4 the west side of Lake Ashtabula, approximately 20 miles north of Valley City in Barnes County.

Population

The population is 30 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Sibley consists of two individuals under the age of 20, and 19 individuals over the age of 65, representing 6.7 percent and 63.3 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 44 housing units in the city consisting of 24 single-family homes, eight mobile homes, and 12 multifamily homes. The city of Sibley is a destination for summer recreation and contains a large number of cabins and second homes.

Services Provided

The city of Sibley obtains potable water from Dakota Rural Water District. The city has a sanitary sewer system and lagoon located north of the city. The city does not have a storm water system. There city has a lift station located adjacent to the fire hall. Brager Disposal Service, Inc. provides garbage services. The city maintains and inert landfill next to the lagoon. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Sibley maintains a park with playground equipment and volleyball net. The city does not have a community center, county shop, library, armory, post office, school, swimming pool, airport or golf course. The fire hall serves as the storm shelter and city hall/community center. There are no county, state or federal government buildings in the city. There are 24 single-family homes, 12 multifamily units and eight mobile homes in the city of Sibley as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Sibley Fire Department provides fire protection to the city and has a fire hall. The city does not have any first responders. Ambulance service is provided by Barnes County.

Utility Providers

Potable water is provided by Dakota Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Sibley. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. ICTC provides phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.11.2 Risk Assessment and Hazard Scoring Notes

Table 8.11.2 summarizes the risk assessment scoring of the city of Sibley. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.11.2.

Table 8.11.2 – City of Sibley Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Sibley | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 2 | 2 | 3 | 1 | 10 |
| Dam Failure | 4 | 2 | 2 | 3 | 1 | 10 |
| Drought | 2 | 2 | 2 | 2 | 1 | 7 |
| Flood | 4 | 3 | 4 | 4 | 1 | 14 |
| Geologic Hazard | 4 | 2 | 4 | 4 | 1 | 13 |
| Hazardous Material Release | 4 | 2 | 1 | 2 | 1 | 8 |
| Homeland Security Incident | 4 | 2 | 1 | 3 | 1 | 9 |
| Severe Summer Weather | 4 | 2 | 3 | 4 | 1 | 12 |
| Severe Winter Weather | 4 | 4 | 4 | 3 | 1 | 14 |
| Shortage or Outage of Critical Materials or Infrastructure | 4 | 2 | 3 | 4 | 1 | 12 |
| Transportation Accident | 3 | 2 | 2 | 3 | 1 | 9 |
| Urban Fire/Structure Collapse | 3 | 2 | 4 | 3 | 1 | 11 |
| Wildland Fire | 4 | 2 | 3 | 4 | 1 | 12 |
| Windstorm | 4 | 4 | 2 | 4 | 1 | 13 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock • Loss of summer time population and economic activity • Some people get sick each year, possible death • Will experience loss of population if an outbreak did occur • There are two people under the age of 20 and 19 people over the age of 65 in the city representing 6.7 percent and 63.3 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. |
| Frequency | 2 | <ul style="list-style-type: none"> • Some people get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 2 | <ul style="list-style-type: none"> • Temporary population maintains properties very well reducing the likelihood of an outbreak or event • Private company south of town with scrap iron can potentially contribute to an incident • Influx of people from the region may increase the likelihood |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: High elderly and retiree population • More vulnerable: Scrap yard south of town • More vulnerable: Campgrounds with high levels of vegetation • More vulnerable: Concentration of people using outhouses • More vulnerable: No medical clinic or hospital • More vulnerable: No local ambulance • More vulnerable: No stockpile of medical supplies • More vulnerable: Small population of stray animals and local wildlife may cause transmission of disease |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of economy • Loss of recreational activities and summer time population • The town would be abandoned |
| Frequency | 2 | <ul style="list-style-type: none"> • Always a possibility of the event occurring |
| Likelihood | 2 | <ul style="list-style-type: none"> • Not likely to occur |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Entire city is vulnerable as Lake Ashtabula is the lifeblood of the local economy |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council |

| | | |
|--|--|---|
| | | <ul style="list-style-type: none"> • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff |
|--|--|---|

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs, casualties (possible) • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Lower water supplies/water shortages • Impacts local food supplies • Increase summer and recreational population • Increase tax revenue and economic activity |
| Frequency | 2 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length • In 2012, dry conditions for June to October - little to no rain • Dry conditions summer of 2014 |
| Likelihood | 2 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable. • Not a lot of drain tile in the area – however farmers are started to install • Hilly terrain will prevent large installations of drain tile • Located on an aquifer with plenty of available water |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Elderly population and retired individuals • More vulnerable: Summer and recreational population • Less vulnerable: Fire Department has fire truck for moving of water |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff • Lack of water conservation plan • City has a drought management plan |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|---------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Roads become blocked and washed out • City park experiences damage with equipment washing into the lake at times • Increased mosquitos-many transmit disease due to lots of grass and debris laying around • Large property loss, vehicles, personal property • Impacts lift station and causes sewer backups • Fire hall experiences seepage |
|---------------|---|--|

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Straw from feedlots and other debris is washed into town causing blockage of flood gates • Potential mold issues due to humidity and location right on Lake Ashtabula • Potential loss of life from flash flooding of water coming down from the hill to the west • Some homes with basements which can become flooded |
| Frequency | 3 | <ul style="list-style-type: none"> • Potential for overland flooding when experiencing heavy rain or a fast snow melt in the spring • Depends largely on the weather • Sump pumps are constantly in homes with basements constantly • Severe overland flooding from heavy rains occurring once every 3 to 5 years • Experienced 7-inch downpour in 2004 |
| Likelihood | 4 | <ul style="list-style-type: none"> • Heavy spring melting and heavy rains occurring every 5 years • Due to lack of storm water system overland flooding is likely in the future • High water table • Installation of drain tile at city park |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: Lack of storm water system • More vulnerable: Lift station vulnerable due to location on the ground and is unprotected from flood waters • More vulnerable: High elderly population and retirees • More vulnerable: Campground grounds and trailer homes • More vulnerable: Local terrain with the city located at the bottom of the hill and on the water allows runoff to run right through the city • More vulnerable: Home and properties having rail ties as foundations • More vulnerable: Few homes have proper footings and foundations • More vulnerable: Road impacted from snow melt depends on location of snow banks • Less vulnerable: Local residents possess equipment for cleanup of debris • Less vulnerable: Installation of drain tile at city park |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

| | | |
|---------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, property, and economy • Reduction in tax base from loss of cabins • Damage to streets, power lines, gas lines, electric lines • Disruption in transportation mobility |
|---------------|---|--|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Disruption in communication • Potential for loss of drinking water • Potential loss of sewer service • Loss of power |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents of the hazard have occurred |
| Likelihood | 4 | <ul style="list-style-type: none"> • Unstable and rocky terrain in the local area • Experience large amounts of erosion from hillside during heavy rains |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Location of the town on the water at the bottom of the hill • More vulnerable: Elderly population and retirees • More vulnerable: Summer and recreation population • More vulnerable: Lift station located adjacent to the Fire Hall • More vulnerable: Pump house located north side of the city • More vulnerable: The entire town is vulnerable due to small size and location • More vulnerable: Location of city utility on the hillside and through the city |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff |

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Town would need to be evacuated if a release large in magnitude occurred • Loss of economy from summer time and recreational population • Potential for fire as a secondary impact • Blocked road and loss of transportation mobility • Loss of habitat for fish and other wildlife |
| Frequency | 2 | <ul style="list-style-type: none"> • Never had any major occurrences • Train hauling toilet paper, four wheelers, laundry detergent and other cargo derailed north of the city 5 miles on the Karnak High Bridge in 2006 |
| Likelihood | 1 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • Trucks transporting larger tanks and carrying more chemicals |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area • More vulnerable: Installation of new cell tower increased reception • More vulnerable: No chemicals stored in the city • More vulnerable: Elderly population and retirees • More vulnerable: Due to the small size of the city, everyone would be impacted |

| | | |
|-------------------|--|--|
| | | <ul style="list-style-type: none"> • More vulnerable: City has fire truck to extinguish a fire from a release if it was a secondary impact • More vulnerable: No stock of medical supplies • More vulnerable: Lack of medical clinic, hospital or local ambulance |
| Capability | | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff |

Homeland Security Incident

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.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss of population • Loss of summer and recreation population |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 1 | <ul style="list-style-type: none"> • No major employers • No school in the city • No dense or large population in the area |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Lack of emergency services except for fire • Less vulnerable: Right off a highway - evacuation route |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Property damage to community buildings • Lightning strike could cause a fire to buildings • Loss of life and injury • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings • Lightning strike to power pole and trees causing power outages • Heavy rains cause overland flooding damaging buildings and structures • Heavy rain causes shifting of soil potentially downing power lines • Possible displacement of an estimated six people based on an average household size of 0.68 people and nine mobile home structures |
| Frequency | 2 | <ul style="list-style-type: none"> • Heavy rain from time to time during summer months • Couple high winds and strong storms per summer season |

| | | |
|----------------------|---|--|
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of storm water drain may contribute to overland flooding • Not a lot of heavy rains in recent years • Strong winds in the last few years |
| Vulnerability | 4 | <ul style="list-style-type: none"> • There are two people under the age of 20 and 19 people over the age of 65 in the city representing 6.7 percent and 63.3 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Roads can become blocked-heavy rains, trees, blown debris • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower • More vulnerable: Elderly population and retirees • More vulnerable: Trailer homes and cabins from summer and recreation population lack structural integrity in the foundations • Less vulnerable: City maintains an inert landfill |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Designated evacuation routes with the County • Limited administrative and city staff |

Severe Winter Weather

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

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Severe low temperatures-increase utility costs • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for fuel for snow removal if we have heavy snow • Highways can become icy reducing mobility speeds • Heavy snow causing melting and potential flooding in the spring • Possible displacement of an estimated six people based on an average household size of 0.68 people and nine mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area. • High winds and ground blizzard conditions • Heavy snow each year • Geography of the city allows for snow to fill city streets with snow |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future due to our climate • Geography of the city allows for snow to fill city streets with snow • Location at the bottom of the hill allows for strong winds into the valley |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are two people under the age of 20 and 19 people over the age of 65 in the city representing 6.7 percent and 63.3 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Trailer homes and cabins for summer and recreation populations • More vulnerable: Lack of paved streets (except for Main Street/Lake Avenue) • More vulnerable: Good roads leading in and out of town • More vulnerable: Elderly population and retirees • More vulnerable: Limited access with only one way in and out of the city • More vulnerable: Bridge over Lake Ashtabula can become blocked from heavy snow blowing of the lake • More vulnerable: City owns snow plow and removal equipment • More vulnerable: No stockpile of medical supplies • More vulnerable: No medical clinic, hospital or local ambulance |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Some financial capabilities for maintaining snow removal equipment • Designated evacuation routes with the County • Limited administrative and city staff • Lack of education or outreach programs |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages cause complete shutting down of the city • Elderly individual impacted from loss of electric and medical supplies • Reduced mobility • Economic impact if outage of utilities occurred and summer/recreation population left |
| Frequency | 2 | <ul style="list-style-type: none"> • Power outages-not long lasting, mostly momentary, up to an hour • Power outages occurs 3 to 4 times per year • Never an issue with water |
| Likelihood | 3 | <ul style="list-style-type: none"> • County clears N.D. Highway 26 • Some residents has their own generator • Clearing of street is done by local residents and with city snow plow • No improvements to power infrastructure planned • Cannot bury power lines due to terrain and unstable soil |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No grocery • More vulnerable: No gas station • More vulnerable: Long response time for local ambulance, police • More vulnerable: Fire department could have some mobility issues • More vulnerable: Elderly population and getting medication • More vulnerable: Cannot bury power lines due to terrain and unstable soil |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Summer and recreation population would overwhelm the city if sustain power outages or loss of water occurred • Less vulnerable: Some people grow local food supply – few |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Some financial capabilities for maintaining snow removal equipment • Designated evacuation routes with the County • Limited administrative and city staff • Lack of education or outreach programs |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles • Potential boating accidents on Lake Ashtabula |
| Frequency | 2 | <ul style="list-style-type: none"> • No major car, truck or train accidents • No boating, jet skis or watercraft accidents |
| Likelihood | 2 | <ul style="list-style-type: none"> • Frequently patrolled by county sheriff - decreases speeding & likelihood • Signs prohibiting trucks from traveling on city streets • Local signs by residents for reduced speeds to avoid pedestrian accidents • Construction of new highway bridge carrying N.D. Highway 26 over Lake Ashtabula is higher and wider and therefore reduces the potential for boating accidents |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Lack of paved streets-soggy roads, pot holes • More vulnerable: Elderly population and retirees • More vulnerable: Lack of street signage, cross walks, sidewalks • More vulnerable: Higher than average amount of boats and watercraft are vulnerable to accidents on Lake Ashtabula • More vulnerable: High concentration of people during the summer hauling cargo, boats • Less vulnerable: Sheriff is good at patrolling N.D. Highway 26 |
| Capability | | <ul style="list-style-type: none"> • Active city council • Limited tax base • Some financial capabilities for maintaining snow removal equipment • Designated evacuation routes with the County • Limited administrative and city staff • Lack of education or outreach programs |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings such as the Fire Hall • Fire could spread and destroy multiple properties from clustering of cabins and trailer, in addition to high wind |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents of building fires or structures |
| Likelihood | 4 | <ul style="list-style-type: none"> • Vegetation can become dry from drought and cause a building to fire, mostly down on large lot with debris • Large amount of cabins and trailer homes that are not up to code • Wiring in homes is outdated |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing-residents will take them in however. • More vulnerable: Lack of water tower or holding tank • More vulnerable: Presence of lake, in addition to a fire truck with pumping capabilities, allowing for endless supply of water for fire suppression • More vulnerable: Distance from neighboring fire departments can lead to more issues, bigger impact, etc. • More vulnerable: Small size of town and spacing of residential structures increases risk • More vulnerable: Lack of building codes |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Some financial capabilities for maintaining snow removal equipment • Designated evacuation routes with the County • Limited administrative and city staff • Lack of education or outreach programs • Lack of building codes |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|-------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat |
| Frequency | 2 | <ul style="list-style-type: none"> • Farmers don't do much control burning • No reports of lightning impacting vegetation and causing a fire |
| Likelihood | 3 | <ul style="list-style-type: none"> • Lack of fire break around the city • Dry conditions each year for a couple weeks, strong winds |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Summer and recreation population lighting off fireworks and setting up campfires along the water |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Lack of manpower • More vulnerable: Prolonged response from surrounding fire districts • More vulnerable: Windy conditions each year • More vulnerable: Trailer homes and cabins for summer and recreation population • More vulnerable: Lack of fire break • More vulnerable: orientation of town on a narrow north-south strip increase vulnerability if the fire came from the north • More vulnerable: Presence of lake, in addition to a fire truck with pumping capabilities, allowing for endless supply of water for fire suppression |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Limited tax base • Some financial capabilities for maintaining snow removal equipment • Designated evacuation routes with the County • Limited administrative and city staff • Lack of education or outreach programs • Lack of building codes |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|-------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Toppled trees, uprooted • Loss of life, injury • Loss of crop and livestock • Loss of power • Could start a fire of buildings and structures • High winds can spread fires causing damage to buildings and structures • Loss of calf barn • Derailment of train near Karnak • Damage to boats and pontoons on Lake Ashtabula as some can flip over • Possible displacement of an estimated six people based on an average household size of 0.68 people and nine mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Straight line winds mostly in summer months, tree debris • Docks and boats damaged or tripped over each summer |
| Likelihood | 2 | <ul style="list-style-type: none"> • Cyclical weather patterns could increase or decrease • Location on the water at the bottom of the valley allows for more direct wind • Tornados do not touch town and travel over the city • More vulnerable: Local terrain with the city located at the bottom of the hill allows wind to gain strength |

| | | |
|-----------------------------|----------|---|
| <p>Vulnerability</p> | <p>4</p> | <ul style="list-style-type: none"> • There are two people under the age of 20 and 19 people over the age of 65 in the city representing 6.7 percent and 63.3 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Power lines in town not buried • More vulnerable: Geographic location at the bottom of the hill • More vulnerable: Cannot bury power lines due to terrain and unstable soil • More vulnerable: Lack of building codes • More vulnerable: Lack of basements • More vulnerable: Majority of structures in the city are trailer homes, campers or cabins • Less vulnerable: Fire hall for shelter |
| <p>Capability</p> | <p>1</p> | <ul style="list-style-type: none"> • Active city council • Limited tax base • Some financial capabilities for maintaining snow removal equipment • Designated evacuation routes with the County • Limited administrative and city staff • Lack of education or outreach programs • Lack of building codes |

8.11.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Sibley.

Problem Statement

Due to its location on Lake Ashtabula, the city of Sibley has a permanent population of around 30 residents and a temporary population from May to September of 300 residents for recreation. The city also experiences overland flooding issues due to surrounding topography. With little to no capabilities other than a drought management plan, the city is dependent on outside sources for mitigation.

Education and outreach to temporary residents, construction of flood control measures and a storm shelter are a priority for the city.

City of Sibley Project 1: Increase education and awareness of wildfire prevention for temporary and recreation populations.

| | |
|--------------------------|---|
| Description/Benefit | Make the public aware of risk to structures from camp fires, outdoor cooking and general recreational activity. |
| Hazards Addressed | Urban Fire/Structure Collapse, Wildland Fire |
| Affected Jurisdictions | City of Sibley |
| Project Status | New |
| Priority | High |
| Responsible Agency | Sibley City Council, Sibley Fire Department, Barnes County Emergency Manager, N.D. Forest Service |
| Partners | City, state, federal, local government, EM |
| Timeframe for Completion | Ongoing |
| Cost | \$5,000 per year |
| Funding Source | Local, state, federal, private |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Sibley Project 2: Construct levee on west of the city that is five feet wide, two feet high and a ½ mile long to divert runoff from surrounding hillsides.

| | |
|--------------------------|---|
| Description/Benefit | Diversion of runoff to eliminate overland flooding issues impacting permanent and temporary residences, the lift station and fire hall to ensure continued operation of the sanitary sewer system and emergency services. |
| Hazards Addressed | Flood (Riverine and Overland) |
| Affected Jurisdictions | City of Sibley |
| Project Status | Continue |
| Priority | High |
| Responsible Agency | U.S. Army Corps. of Engineers, State Water Commission, Barnes County Commission, city councils, township boards |
| Partners | City councils, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, State and Federal Grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 4 | 1 | 5 | 5 | 30 |

City of Sibley Project 3: Install generators for the city lift station and fire hall.

| | |
|--------------------------|---|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system to ensure resiliency. To maintain continued operation of the fire hall. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Sibley |
| Project Status | New |
| Priority | High |
| Responsible Agency | Sibley City Council, Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state, federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Sibley Project 4: Install upgraded warning system.

| | |
|--------------------------|--|
| Description/Benefit | Install updated warning siren replacing manually-activated siren with county-dispatch-activated siren. The siren provide warning for people to take shelter from approaching storms. |
| Hazards Addressed | Fire, Severe Summer Weather, Windstorm |
| Affected Jurisdictions | City of Sibley |
| Project Status | New |
| Priority | High |
| Responsible Agency | Sibley City Council, Barnes County Emergency Manager |
| Partners | Barnes County Commission, fire departments and districts |
| Timeframe for Completion | 1 to 3 years |
| Cost | \$7,500 per siren |
| Funding Source | City, county, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Sibley Project 5: Construct storm shelter.

| | |
|--------------------------|--|
| Description/Benefit | To reduce or eliminate injury and death from severe weather. |
| Hazards Addressed | Flood, Severe Summer Weather, Severe Winter Weather, Fire, Windstorm |
| Affected Jurisdictions | City of Sibley |
| Project Status | New |
| Priority | High |
| Responsible Agency | Sibley City Council, Barnes County Emergency Manager, Barnes County Commission |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council, NDDDES, Red Cross |
| Timeframe for Completion | 3 to 5 years |
| Cost | Up to \$75,000 |
| Funding Source | County, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 4 | 4 | 5 | 5 | 5 | 5 | 33 |

8.11.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Sibley with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Sibley.

The city of Sibley has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The city does not have a civil engineer, but can contract with a private firm when services are needed. The county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services. However, the auditor, mayor and city council have grant writing capabilities as an arbor day grant was written by staff and awarded. The city conducts an annual clean up with additional infrastructure maintenance conducted on an as-needed basis. The city is part of the county-wide mutual aid agreement for emergency services. The city has an emergency siren located at the fire hall, but it is not adequate as it is manually activated. The city does not have any generators. The fire ISO rating for the city is nine. The city does not have a fire index sign. Emergency services are not GIS capable. The fire chief reports hazard data to the emergency manager. The city is not Firewise or StormReady Certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Sibley.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does not maintain a website with hazard education. A website with hazard education is available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. The Sodbusters, a monthly social club, provides education and outreach on hazards. The city also has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Sibley.

The city does not set aside tax revenue for capital improvements and only has a general fund. The city does not have storm water utility fee as it lacks a storm water system. The city charges a monthly sanitary sewer fee of \$50, which is placed on the water/sewer/garbage bill. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Sibley.

The city does not have a comprehensive, strategic, capital improvements, land use, water conservation or storm water plan. The city does have a drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city has zoning in place dating back to the 1960s. The city is considering updating its zoning in 2015. The city does not have subdivision ordinances or impact fees. The city issues building permits for development. The city council serves as the planning commission for the city. The city has not adopted state building codes and does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

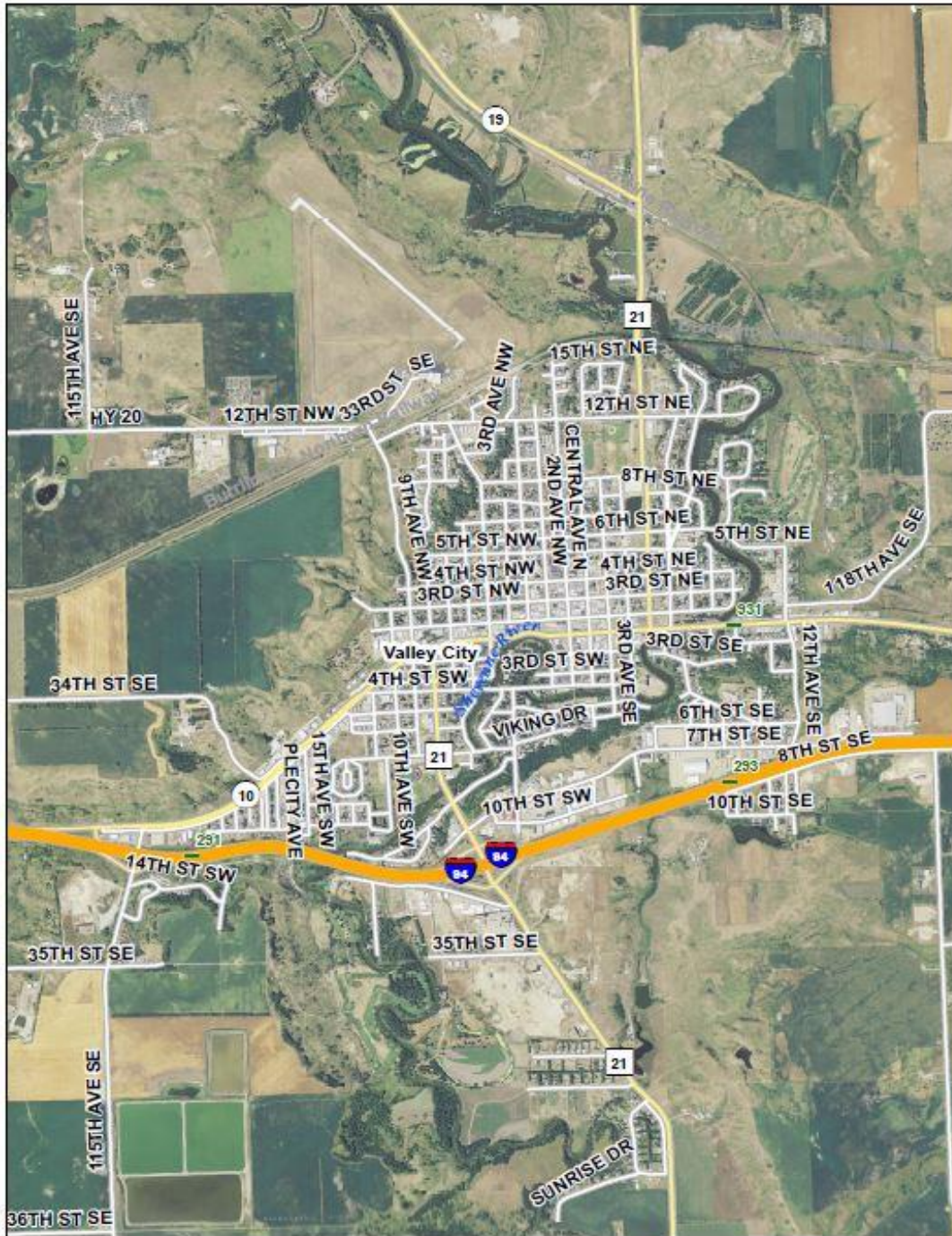
Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.12 City of Valley City

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.12.1, 8.12.2, 8.12.3, and 8.12.4. Figure 8.12.1 shows an aerial view of the city of Valley City with the city limits.

Figure 8.12.1 – City of Valley City



Source: Barnes County Emergency Management

8.12.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Valley City. Detailed narratives follow each section heading to profile the city. Additional information on the city of Valley City and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Valley City is located at the intersection of Interstate 94 and Barnes County Highway 21 in the central portion of Barnes County.

Population

The population is 6,585 according to the 2010 U.S. Decennial Census. The U.S. Decennial Census 2013 Estimate recorded a population of 6,699, an increase of 114 people, or 1.7 percent from 2010.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Valley City consists of 1,490 individuals under the age of 20, and 1,447 individuals over the age of 65, representing 22.6 percent and 22.0 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 3,267 housing units in the city consisting of 1,924 single-family homes, 96 mobile homes, and 1,247 multifamily homes.

Services Provided

The city of Valley City obtains potable water from the Valley City Public Works Department. The city has a sanitary sewer system and lagoon. The city has a storm water system. There are 11 lift stations in the city: one master lift station and 10 satellite lift stations. Garbage and sanitation is provided by the public works department. Valley Recycling provides recycling services. An inert disposal site is also operated by the public works department. The Valley City Times-Record is the official newspaper.

Jurisdictional Buildings

The city of Valley City has a post office, city hall, community/wellness center, city shop, city/county library, armory, junior high/high school and two elementary schools, swimming pool, airport and two golf courses. The city is also the location of the Barnes County Courthouse, City-County Health District, Barnes County Highway Department, U.S. National Guard, U.S. Department of Agriculture, Farm Services Agency, U.S. Army Corps of Engineers, N.D. Department of Transportation office, Barnes County Rural Water District office, Barnes Rural Water District office, and Valley City State University. The city has a public library which also serves as the county library. The city has a county shop. Shelters are located at Jefferson Elementary School, Hi-Liner Activity Center, Veterans of Foreign Wars, Valley City Rec Center, Graichen Gym, Robertson Hall, Washington Elementary School, Epworth United Methodist Church and WE Osmon Fieldhouse. The city auditorium was also used as a shelter but was

sold to a private entity. For parks and recreation, the city has a campground, nine athletic facilities and 10 parks. The county golf course is located in Valley City. In Valley City, there are 1,924 single-family homes, 1,247 multifamily units and 96 mobile homes as of the 2012 American Community Survey.

Emergency Response Services

Law enforcement is provided by the Valley City Police Department. The police department has a police station adjacent to the Valley City City Hall. The Valley City Fire Department provides fire protection to the city while the Valley City Rural Fire District provides fire protection to surrounding areas. The city has first responders and the fire department and district maintains a rescue squad. Both are based in the Valley City Fire Hall located adjacent to the Valley City City Hall. Ambulance service is provided by Barnes County. The Barnes County Ambulance maintains a facility in the city of Valley City located on 15th Ave SW near west Main Street.

Utility Providers

Potable water is provided by Valley City Public Works. Electricity is provided to the city by Missouri River Energy Services (MRES) and Western Area Power Administration (WAPA). The city owns its own transmission lines and substations, which are maintained by Valley City Public Works. MDU provides natural gas to the city. Fuel oil and propane are used as an alternative heating source and providers are chosen by the individual consumer. Bek Communications, CSI, and Qwest provide phone and internet. Cable is provided through Qwest or households may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.12.2 Risk Assessment and Hazard Scoring Notes

Table 8.12.2 summarizes the risk assessment scoring of the city of Valley City. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.12.2.

Table 8.12.2 – City of Valley City Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Valley City | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 3 | 3 | 3 | 3 | 10 |
| Dam Failure | 4 | 1 | 1 | 4 | 2 | 8 |
| Drought | 1 | 2 | 2 | 2 | 3 | 4 |
| Flood | 4 | 4 | 4 | 4 | 1 | 15 |
| Geologic Hazard | 3 | 2 | 3 | 3 | 1 | 10 |
| Hazardous Material Release | 4 | 2 | 3 | 4 | 1 | 12 |
| Homeland Security Incident | 4 | 3 | 3 | 4 | 2 | 12 |
| Severe Summer Weather | 3 | 4 | 4 | 2 | 3 | 10 |
| Severe Winter Weather | 3 | 4 | 4 | 2 | 3 | 10 |
| Shortage or Outage of Critical Materials or Infrastructure | 3 | 2 | 3 | 4 | 2 | 10 |
| Transportation Accident | 4 | 4 | 4 | 4 | 1 | 13 |
| Urban Fire/Structure Collapse | 4 | 3 | 3 | 3 | 2 | 11 |
| Wildland Fire | 4 | 4 | 4 | 3 | 2 | 13 |
| Windstorm | 3 | 4 | 4 | 2 | 3 | 10 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|-------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of economy from crops and/or livestock loss • Residents get sick each year • Always a possibility of human death • An outbreak would spread and affect large numbers of city residents • Mercy Hospital can become overwhelmed and experience supply shortages • Mercy Hospital can experience staffing issues • Shortage of funding limits ability of city-county health and Mercy Hospital to set up temporary immunization centers and train staff • Mass casualties can overwhelm funeral homes and hospital as morgue has limited space • City and county operations could experience difficulty in day-to-day operation if mass casualties occurred from an outbreak or pandemic • Outbreak in school-age children from unimmunized children exposing others to communicable diseases resulting in missed school days • Loss of vaccinations and medical supplies due to lack of refrigeration units and backup generator |
| Frequency | 3 | <ul style="list-style-type: none"> • Some people get sick each year • Crop loss and localized livestock loss occurs each year to a varying degree • City experienced Pertussis issues in 2005 in school-age children due to exposure from an unimmunized child • H1N1 pandemic occurred in 2009 and City-County Health administered large amount of vaccines to protect local population • State of North Dakota and City-County Health is conducting mitigation planning to track individuals who recently came from Africa to track the Ebola Virus |
| Likelihood | 3 | <ul style="list-style-type: none"> • Installation of new flood control measures reduces amount of standing water and flood damage to homes • Mercy Hospital and medical clinics in the city are well-prepared to handle general needs of local population but have limited supplies to handle a large outbreak • Staffing capacity of Mercy Hospital and medical clinics are adequate for every day needs but are not staffed for emergency situations such as an outbreak • Residents mow lawns and keeps vegetation under control • City mows public parks and open spaces to regulate growth and extent of vegetation • Increased air travel from domestic and international locations, in addition to the city being located on Interstate 94, increases likelihood of a communicable disease infecting the local population • Presence of international students at Valley City State University increases chances of a communicable disease being transmitted among the student population and general population |

| | | |
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| | | <ul style="list-style-type: none"> • Lack of adequate storage space and refrigeration units for stockpile of medical supplies |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 1,490 people under the age of 20 and 1,447 people over the age of 65 in the city representing 22.6 percent and 22.0 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: 19.2 percent of population is over 65 compared to 14.2 percent in North Dakota • More vulnerable: Presence of abandoned buildings and un-kept structures may contribute to spread of diseases • More vulnerable: Presence of populations living in trailer homes, subsidized housing, senior housing, and student-populations lack transportation options to access medical care • More vulnerable: Lack of adequate storage space and refrigeration units for stockpile of medical supplies • More vulnerable: Lack of generator for backup power may lead to loss of vaccines as they cannot be kept at appropriate temperatures • More vulnerable: New location of City-Couth Health offices lacks level of security system present at former location at Barnes County Courthouse • More vulnerable: Presence of day care centers in the city • More vulnerable: Shrinking available of funds for emergency preparedness and response planning limits ability of City-County Health to educate staff and general public • Less vulnerable: Well-trained and educated EMT and ambulance staff • Less vulnerable: Presence of mass media communication from internet and television increases awareness of communicable disease • Less vulnerable: 20.5 percent of population is under 18 compared to 22.5 in North Dakota • Vulnerability depends largely on the type of disease and impacted population |
| Capability | 3 | <ul style="list-style-type: none"> • Active city council • City of Valley City has mass-shelter plan and evacuation plan • City-County Health conducts education or outreach programs through mass media (radio), education of in public schools, in Kiwanis, day care groups and of general daily clients served • City-County Health director and staff well-trained and educated on mitigation strategies for communicable disease • City-County Health possessed staff for administration of grants and education programs • Possesses staff and technical resources to accomplish projects independently |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

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| Impact | 4 | <ul style="list-style-type: none"> • Total loss of Valley City’s structures, businesses, infrastructure, and housing, transportation routes, schools, etc. • Loss of 3,247 housing units • Mass casualties will occur • Economic disruptions state-wide |
| Frequency | 1 | <ul style="list-style-type: none"> • No major incidents have occurred in the past |
| Likelihood | 1 | <ul style="list-style-type: none"> • Staff at Baldhill Dam and Army Corps of Engineers |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: All city infrastructure supporting health and quality of life is vulnerable |
| Capability | 2 | <ul style="list-style-type: none"> • City has an Evacuation Plan • Staff at Baldhill Dam and Army Corps of Engineers • Active city council • Educated public works and city departments to aid in evacuation |

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

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| Impact | 1 | <ul style="list-style-type: none"> • Loss of crop, livestock, economic activity and jobs • Casualties possible • Increased risk to buildings from fire hazards • Higher cost to cool homes resulting in increased utilities • Lower water supplies may lead to water shortages • Impacts locally-grown food supplies as water shortages may occur • Restrictions on water use by city residents • Reduction in availability of water for drinking purposes • Wells would need to be used and would run dry • Local economy dependent on agriculture |
| Frequency | 2 | <ul style="list-style-type: none"> • Severe drought in 1988 • Some dry conditions each year lasting a couple weeks in length • In 2013 and 2014, dry conditions lasted for June to October |
| Likelihood | 2 | <ul style="list-style-type: none"> • Weather patterns are cyclical and unpredictable • Drain tile starting to be installed in and around the city • Little irrigation in and around the area decreases likelihood of water resource depletion • City water is provided by city public works • High water content in the soil and high water table decreases likelihood of severe drought |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Lack of individual wells can decrease and increase vulnerability • More vulnerable: High elderly population |

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| | | <ul style="list-style-type: none"> • More vulnerable: Abandoned structures are vulnerable to fire potential from dry conditions • More vulnerable: City public works has capacity for water storage lasting the city up to 2 days without water restrictions and with restrictions up to 3 days • More vulnerable: City is vulnerable as it is dependent on surface water for potable water • More vulnerable: City schools, university, dependent populations, senior housing • Less vulnerable: Water is provided own city system |
| Capability | 3 | <ul style="list-style-type: none"> • Active city council • Water Conservation Plan and Drought Management Plan • Water restriction criteria in Drought Management Plan • Relies on county, regional, state and other agencies for assistance • Education and outreach through the Valley City Times-Record to education public on strategies to restrict water usage • Possesses resources to accomplish projects independently • City maintains wells as backup water supply that would last around a month • City installed Automatic Metering and Infrastructure with targets that can be put into place to limit water usage, warning, fine and then complete shut off |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

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| Impact | 4 | <ul style="list-style-type: none"> • Blocked roads • Increased mosquito and transmitting of diseases from standing water • Basements have become flooded • Residents have sump pumps running 24/7 • Large loss of property, vehicles, personal property • Some casualties are possible • Residents may miss work from flooding of basements or damage to personal property resulting in loss of economy • Loss of access in and out of the city due to flooding of roadways • Mental health issues in general population from trauma experienced through property and personal loss due to flooding • Contamination of water wells serving as source of drinking water for individuals due to flooding may result in disease outbreaks • Spoiling of food due to loss of electricity may result in disease • Sewer and water systems are out of commission from flooding and loss of power contributing to property damage and transmission of disease |
| Frequency | 4 | <ul style="list-style-type: none"> • Only happens when a lot of rain falls or snow in the winter • Depends largely on weather patterns • Large snow melt in spring of 2009, 2010 and 2011 resulted in riverine and overland flooding of city streets |

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| | | <ul style="list-style-type: none"> • In June 2013, approximately 30% of basements were flooded from heavy rainfall (around 4 inches in first hour) • In the past 10 years, a heavy rain episode has occurred each year resulting in flash flooding |
| Likelihood | 4 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Storm water system • High water table • No drain tile in the area may increase amount of standing water • Topography does not allow swift drainage of precipitation, snow melt, standing water • Installation of new flood control measures reduces amount of standing water and flood damage to homes • Heavy rainfall in April would result in major overland flooding as city storm drains are closed as river is high from spring snow melt • City essentially becomes a closed basin • City maintains gravity-fed storm water system • City-County Health worked with care centers to educate staff on property hand-washing and handling of residents when access to running water was temporarily unavailable |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: High elderly population • More vulnerable: City lacks equipment and infrastructure to address flooding • More vulnerable: Major sanitary sewer line parallels the river for around 10 city blocks • More vulnerable: Main sanitary sewer collection lines runs under main street adjacent to river for 12 blocks • Less vulnerable: Extensive manpower provided by the fire department • Less vulnerable: Fire department and public works has equipment to pump standing water out of low-lying areas • Less vulnerable: Installation of pump stations in the future • Less vulnerable: City has one master lift station and 10 satellite stations, which is located on the river nearing lowest spot • Less vulnerable: Installation of new culverts decreases amount of standing water |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance with flood protection • Flood fight is done by outside entities such as the Corps of Engineers • No active education or outreach programs • Fire department has portable pumps and extensive manpower • Lacks resources to accomplish projects independently • City-County Health operates a hotline • City has limited financial means to construct flood control measures and invest in new sanitary sewer and storm water infrastructure • Public works and city staff are trained and educated to mitigate |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

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| Impact | 2 | <ul style="list-style-type: none"> • Loss of life, property and economy • Reduction in tax base from loss of residential homes, cabins and recreational areas • Damage to streets, power lines, gas lines, electric lines • Disruption in transportation mobility • Disruption in communication • Severed fiber optic lines cause business interruptions • Potential loss of sewer service • Loss of power • Approximately 20 single-family homes have experienced sliding |
| Frequency | 2 | <ul style="list-style-type: none"> • 16 homes have been moved between 1993 and 2014 with more scheduled in the future |
| Likelihood | 3 | <ul style="list-style-type: none"> • Unstable and rocky terrain in areas to the west, southeast and east of the city • Soil types and changing in climate patterns increase chances of the hazard |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Bridges, roads, infrastructure • More vulnerable: Buried power lines and utility services • More vulnerable: Single-family subdivisions in and around Valley City • Less vulnerable: Better awareness of soil types and better planning management for new development • Less vulnerable: Homes and infrastructure in the area have been moved or improved to ensure resiliency |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Administration and staff to complete buyouts and moving of homes and infrastructure • Planning and regulatory limitations in place to limit development in areas at risk to the hazard • Relies on outside agencies and organizations to assist in infrastructure projects to mitigate the hazard |

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|---------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked roads leading to loss of transportation mobility • Blocked roads could result in temporary isolation and shortage or outage of critical materials or infrastructure • Small size of city could lead to large losses of property and people |
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| | | |
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| | | <ul style="list-style-type: none"> • Could result in explosion and destruction of buildings from trains carrying hazardous chemicals and oil shipments • Mass casualties if a release were to occur on Interstate 94 or the hi-line bridge over the city • Potable water sources could be contaminated if a release were to impact the Sheyenne River |
| Frequency | 2 | <ul style="list-style-type: none"> • Never had any major occurrences or incidences • Chemicals and other materials are stored in city limits |
| Likelihood | 3 | <ul style="list-style-type: none"> • Propane is used for heating alternative some a few residences • Anhydrous stored in tanks in city limits on south side of railroad tracks • Railroad hauling chemicals and oil through city limits has increased astronomically since 2010 • Presence of side track allows parking of freight trails increases amount of hazardous material temporarily stored in city limits • Natural gas availability as heating source decreases propane and alternative fuel sources • City located on Interstate 94 which carries large amounts of truck traffic carrying chemicals and other hazardous materials • Construction of CHS nitrogen fertilizer plant will increase likelihood of a release • Trains have slowed down while traversing Hi-Line Bridge |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Anhydrous ammonia fill station location results in truck traffic hauling chemicals in and out of city limits • More vulnerable: High elderly population • More vulnerable: Small size of city would leave all residents impacted • More vulnerable: Limited traffic control signage and enforcement on Barnes County Road 11 and 22 • More vulnerable: Covered by Barnes County Ambulance, but may result in prolonged response times • More vulnerable: Lacks hazardous material route • More vulnerable: Presence of side track allows parking of freight trails increases amount of hazardous material temporarily stored in city limits • More vulnerable: Egress from the city is limited to evacuate the population if an incident occurred • Less vulnerable: Medical supplies in stock at fire hall and at homes of first responders • Less vulnerable: Cell phone service in the area is reliable |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • City has Evacuation Plan • Public works and city departments went through training on incident command |

Homeland Security Incident

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.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Mass casualties, economic losses, and widespread panic • Potential for population loss if incident occurred • Small size of city could lead to large losses of property and people • Potential loss of drinking water source if river were contaminated • Permanent abandonment of the city depending on the incident/chemical used and the magnitude of destruction |
| Frequency | 3 | <ul style="list-style-type: none"> • No incidents have occurred • Valley City Police Department stated no incidents of bomb threats at public schools and facilities, or calls at businesses in recent years • There is a high possibility for an incident at any location |
| Likelihood | 3 | <ul style="list-style-type: none"> • Presence of Valley City State University bringing in international faculty and populations • Presence of the Hi-Line Bridge carrying oil, chemicals, freight over high above the city |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: High elderly population • More vulnerable: High population of school-aged children • More vulnerable: City located at intersection of railroad lines carrying oil, chemicals and other freight • More vulnerable: Lack of proper equipment and response technology by police department • More vulnerable: Lack of funding to train and educate employees as turn-over occurs at City-County Health, Mercy Hospital, healthcare system, in addition to emergency services such as police and fire departments • More vulnerable: Potential loss of potable and drinking water source if river were contaminated • More vulnerable: Lack of knowledge by general population of proper shelter-in-place techniques • More vulnerable: Lack of property emergency equipment for the police department • More vulnerable: Lack of air-purifying respirator (gas mask) and self-contained breathing apparatus to perform rescue operations • More vulnerable: Surrounding topography with the city being located in a river valley allows for chemicals to settle within city limits and have a staying permanence • Less vulnerable: Located on Interstate 94 and county roads which can be used as evacuation routes • Less vulnerable: City-County Health has capability to disperse medications on a large scale |
| Capability | 2 | <ul style="list-style-type: none"> • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies • Education or outreach programs performed on a routine basis at public schools, Valley City State University, and general public |

| | | |
|--|--|--|
| | | <ul style="list-style-type: none"> • Lacks resources to accomplish projects independently • City has an evacuation plan • No enough staff |
|--|--|--|

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|---|
| Impact | 3 | <ul style="list-style-type: none"> • Damage to homes and community buildings from hail, broken windows, loss of shingles, fallen tree debris • Power outages • Lighting strike could cause a fire to buildings • Potential injury and loss of life • Potential loss of livestock and economy • Cars become stalled due to high water • Streets can become soggy from moisture could wash out • Straight-line winds can cause damage to buildings • Small size of city limits impacted areas and populations • Severe storms can potentially destroy majority of structures in the city • Large financial impact to local economy as it is heavily reliant on agriculture • Possible displacement of an estimated 194 people based on an average household size of 2.02 people and 96 mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Heavy rain from time to time during summer months • Around two-to-three high winds and strong storms per summer season • Each year structures experience damage to shingles • Each year tree branches fall and damage structures • Large hail storm in 2013 resulting in large amount of homes needing to be re-shingled • Heavy rain events every other year results overland flooding as city is located in a closed basin topography |
| Likelihood | 4 | <ul style="list-style-type: none"> • Lacks storm water drainage system • Heavy rain events every year • Climatic patterns of the area will result in several storms per year |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are 1,490 people under the age of 20 and 1,447 people over the age of 65 in the city representing 22.6 percent and 22.0 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Location of master lift station • More vulnerable: Lack of storm drainage system • More vulnerable: Prolonged response times and limited access for emergency services • More vulnerable: Large amount of manpower and volunteers on fire department • More vulnerable: High elderly population • More vulnerable: High school-age population • More vulnerable: Roads in and out of town are maintain and sufficient |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: City has emergency siren activated by county dispatch • More vulnerable: Most city residents are not signed up for Code Red • Less vulnerable: City has inert landfill • Less vulnerable: Contract with city of Fargo for waste services • Less vulnerable: City has adopted build codes and has enforcement to ensure integrity of structures • Less vulnerable: Fire department has equipment for moving of water and debris • Less vulnerable: City residents have equipment and volunteer time and resources for clean up • Less vulnerable: City streets are in the process of being re-graveled • Less vulnerable: Presence of three storm shelters |
| Capability | 3 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Public work is well funded • Lacks resources to accomplish projects independently • Has adopted state building codes and has enforcement |

Severe Winter Weather

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

| | | |
|-------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Blocked roads and power outages from heavy snow • Isolation of the community from blocked roads • Severe low temperatures can increase utility costs • Potential loss of life and injury • Loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal • Highways can become icy reducing mobility speeds • Heavy snow results in potential flooding in the spring • Frozen water services limits available of • Blocked roads increases difficulty for elderly residents to travel and access necessary medical services • Possible displacement of an estimated 194 people based on an average household size of 2.02 people and 96 mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Happens yearly due to weather and climate in the area • High winds and ground blizzard conditions occurs each year • Ice storm occurred in 1997 resulting in temporary isolation of the community |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future due to the climate • Removal of shelter belts and vegetation around the city leads to more ground blizzard conditions in the local area • Topography of the city being located in a closed basin contributes to impacts of the hazards |

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| Vulnerability | 2 | <ul style="list-style-type: none"> • There are 1,490 people under the age of 20 and 1,447 people over the age of 65 in the city representing 22.6 percent and 22.0 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: High elderly population • More vulnerable: High school-age population • More/less vulnerable: Adopted state building codes but lacks enforcement • More vulnerable: Downtown buildings with flat roofs are vulnerable to heavy snow loads on roofs • Less vulnerable: Neighborhoods will help each other out • Less vulnerable: High winds does not allow accumulation of snow on top of structures resulting in lower snow loads on roofs • Less vulnerable: City residents have equipment and volunteer time and resources for clean up • Less vulnerable: County clears city streets |
| Capability | 3 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • Has adopted state building codes but lacks enforcement |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|-------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages • Elderly individuals impacted from loss of electric and medical supplies • Reduced mobility from blocked • Limited drinking water and functionality of sanitary sewer if power outages occurred • Property damage from sewer backups due to loss of sanitary sewer • Loss of economy and economic activity |
| Frequency | 2 | <ul style="list-style-type: none"> • Major power outages occurs every couple of years but length is never longstanding • Water restrictions have been put into place in 2008 • Ice storm in 1997 resulted in little damage to the city |
| Likelihood | 3 | <ul style="list-style-type: none"> • County clears county road and state clears Interstate 94 • City resident clear roads during winter months • Municipal power system has limited resources as compared to a larger company and may increase length of outage • Increase in train traffic, which can block roadways, may increase isolation of community |

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Largely dependent on intensity of weather event in terms of blocked roads, outages of infrastructure and services • City does not have joint municipal agreements which increases independent nature of the system |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Long response time for ambulance and police • More vulnerable: Emergency services can experience temporary mobility issues from blocked roads • More vulnerable: High elderly population • More vulnerable: High school-age population • More vulnerable: Senior housing and VCSU • More/less vulnerable: Residents no longer maintain individual wells for potable sources • More vulnerable: Area residents and city lack equipment to clear roads and maintain infrastructure • More vulnerable: 12th Street and old Highway 10 experience issues with snow and blocked roads • More vulnerable: Topography of area allows for heavy accumulation of snow • More vulnerable: City has a lot of vulnerable populations • More vulnerable: Mercy hospital is located adjacent to the city with mechanical systems located in the basement • More vulnerable: City buildings and infrastructure are all located in flood plain except the water treatment plant • Less vulnerable: Fire City public works maintains street clearing staff and equipment • Less vulnerable: Fire department has equipment for moving water • Less vulnerable: Two grocery stores • Less vulnerable: Gas stations • Less vulnerable: Some residents grow local food supply • Less vulnerable: City residents have equipment and volunteer time and resources for clean up • Less vulnerable: County clears city streets |
| Capability | 2 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • Public works moves critical equipment out of flood plain |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|---------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life and injury • Loss of economy • Loss of property such as cars and trucks • Can result in HAZMAT • Can result in fires of buildings, equipment and vehicles |
|---------------|---|--|

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Results in temporary isolation of the community from blocked roads • Increases response times for emergency services from blocked roads and may result in death of area resident • Business interruptions |
| Frequency | 4 | <ul style="list-style-type: none"> • No major accidents involving trains or trucks in the area in recent years • Small-to-moderate traffic accident occurring roughly • Casualty as air show in 2012 • Pedestrian death in 2014 • Collision of semi-trucks on Interstate 94 in 2014 |
| Likelihood | 4 | <ul style="list-style-type: none"> • Adequate enforcement by city police department • Increased in train traffic carrying oil and other shipments • Increase in traffic on Interstate 94 • City located at the junction of two railroad lines increases likelihood |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Airport • More vulnerable: No local ambulance with response times from Barnes County prolonged • More vulnerable: High elderly population • More vulnerable: High school-age population results in high risk for pedestrian accident • More vulnerable: Lack of ordinances restricting use of recreational vehicles in city limits • More vulnerable: Increased in train traffic carrying oil and other shipments • More vulnerable: Increase in traffic on Interstate 94 • More vulnerable: City located at the junction of two railroad lines increases likelihood • More vulnerable: Landing path for planes at the airport is located directly over the city • Less vulnerable: Adequate crosswalks, sidewalks and stop lights regulate traffic movements and speeds • Less vulnerable: Adequate street signage recently improved resulting in better awareness of traffic in city limits • Less vulnerable: Medical supplies in stock at fire hall and at homes of first responders • Less vulnerable: Fire hall has truck for fire suppression and assistance in accidents • Less vulnerable: National Guard is headquartered in the city • Less vulnerable: Adequate enforcement by County Sheriff on county roads • Less vulnerable: Hospitals and medical clinics are located in city limits |
| Capability | 1 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, and personal possessions • Loss of economy from business interruptions, lost jobs, and lost homes • Loss of community assets/buildings/infrastructure • Loss of multiple properties as some neighborhoods are dense and spacing of structures close together • Mental health issues in city residents from financial loss, loss personal possession and temporary displacement • Catastrophic loss to individuals as losses to the community are absorbed • Collapse of downtown buildings with flat roofs from heavy snow • Losses due to fire is greater in rural setting due to low supply of water for fire suppression • Could result in HAZMAT as chemicals are stored in city limits • Health hazard due to poor air quality from burning of household items inside structures that can release chemicals |
| Frequency | 3 | <ul style="list-style-type: none"> • Approximately 50 percent are insignificant calls and are minor in nature • A major house fire occurred in January 2014 resulting in total loss • Lost two houses and three cars in a fire that spread in 2011 |
| Likelihood | 3 | <ul style="list-style-type: none"> • Some abandoned buildings are not well kept • Vegetation can become dry from drought and cause a building fire • City mows and maintains vegetation in public parks and city lots • Loss of multiple properties as some neighborhoods are dense and spacing of structures close together • Age of structures and wiring is out of date in some structures and may increase likelihood of an incident • City adopted building codes and has enforcement to assure proper building construction • Fire department and fire chief have ability to inspect remodel projects on residential homes • Urban fire is more likely to occur in Valley City than surrounding rural areas due to high concentration of population |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing for displaced residents • More vulnerable: Small size of town and spacing of residential structures reduces risk, however buildings on main street are close together and hazardous • More vulnerable: Abandoned buildings are not well kept • More vulnerable: High senior population • More vulnerable: High school-age population • More vulnerable: Valley City State University with dormitories housing students in close quarters • More vulnerable: Senior housing facilities • More vulnerable: Presence of mentally challenged individuals living in housing facilities and single-family homes throughout the city • More vulnerable: Rural areas more vulnerable to structure fires due to low supply of water for fire suppression |

| | | |
|-------------------|---|--|
| | | <ul style="list-style-type: none"> • More vulnerable: Older downtown structures lack modern sprinkler systems • More vulnerable: Lack of plowed roads in winter months decreases mobility of fire trucks and limited accessibility • Less vulnerable: City fire department and public works has ability to pump water from city hydrants and with equipment from river • Less vulnerable: City maintains five water towers and tanks for backup water supplies for suppression • Less vulnerable: High water table and moisture in the soil • Less vulnerable: Loss of CRP near city limits • Less vulnerable: Distance from neighboring fire departments can lessen issues • Less vulnerable: Fire department has trucks and equipment to move water • Less vulnerable: Mercy Hospital and medical clinics serving the city’s population • Less vulnerable: Barnes County EMT/Ambulance is headquartered in the city • Less vulnerable: Fire department is well trained and educated on property fire suppression techniques • Less vulnerable: City maintains water tower for backup water supplies for suppression • Less vulnerable: High water table and moisture in the soil • Less vulnerable: Adopted state building codes and has enforcement |
| Capability | 2 | <ul style="list-style-type: none"> • Active city council • Fire department has stable funding from the city • Fire department conducts pre-planning for best use of resources to address each fire’s specific needs • Fire department chief and staff has ability to write grants • Relies on county, regional, state and other agencies for assistance as fire department only has one full-time staff member • Fire department has one truck with GPS navigation • Fire department conducts fire prevention week and fire drills at public schools and Valley City State University • Has adopted state building codes and has enforcement • National Guard is located in the city |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life and injury • Property such and structures and farm equipment from fires • Loss of wildlife habitat • Could result in loss of crops and livestock and economy activity • Loss can potentially be catastrophic to individual farmers or landowner as the loss is highly localized |
| Frequency | 4 | <ul style="list-style-type: none"> • Farmers conduct large amount of controlled burning |

| | | |
|----------------------|---|---|
| | | <ul style="list-style-type: none"> • Approximately 5 percent of controlled burns become uncontrolled • Approximately 30 wildland fires occur in the spring and fall each year • No reports of lightning starting fires |
| Likelihood | 4 | <ul style="list-style-type: none"> • Dry conditions each year for a couple weeks with strong winds • Reduction of CRP in and around the city in recent years • Increase in railroad traffic contributes to likelihood of wildland fire from hot sparks emitted from friction on hot breaks • Grassland is present near city limits • Increased traffic on Interstate 94 can increase likelihood due to litter and cigarette butts thrown from passing motorists • Abandoned buildings may cause a structure fire and can potentially result in a wildland fire |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Windy conditions each year • More vulnerable: Presence of sloughs reduces mobility of fire department vehicles and limits accessibility • More vulnerable: Large elderly population living in surrounding rural areas • More vulnerable: Potentially prolonged response time from fire department due to size of coverage area • Less vulnerable: Reduction of CRP • Less vulnerable: Fire hall has truck for fire suppression and assistance in incidences • Less vulnerable: Short response from surrounding fire departments • Less vulnerable: High water table and moisture in the soil • Less vulnerable: County-wide mutual aid agreement for emergency services • Less vulnerable: N.D. Game and Fish Department maintains a four-wheel drive ranger vehicle with fire suppression equipment that is available to fire district if needed |
| Capability | 2 | <ul style="list-style-type: none"> • Active township board for rural fire district • Fire district does not have stable funding from the townships • Fire district conducts pre-planning for best use of resources to address each fires specific needs • Fire district chief and staff has ability to write grants • Fire district chief and staff are well-trained and educated on proper wildland fire suppression techniques • Fire district relies on county, regional, state and other agencies for assistance as district lacks full-time staff • Fire district has one truck with GPS navigation • Fire district conducts fire prevention week and fire drills at public schools and Valley City State University • Natural Guard is located in the city |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Damage to homes and community buildings such as broken windows, loss of shingles • Toppled trees can become uprooted and damage buildings • Loss of life and possible injury • Loss of crop and livestock • Loss of power • Could start a structure fire • Can contribute to spread of wildland fires • Wind can cause accumulation of snow on city street and block roadways which results in temporary isolation • Fallen power lines • Possible displacement of an estimated 194 people based on an average household size of 2.02 people and 96 mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Straight line winds mostly in summer months • Blizzards occur frequently in winter months |
| Likelihood | 4 | <ul style="list-style-type: none"> • Cyclical weather patterns could increase or decrease • Topography of area with flat land allow wind to travel uninterrupted • River valley acts as a funnel and channels wind into the city |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are 1,490 people under the age of 20 and 1,447 people over the age of 65 in the city representing 22.6 percent and 22.0 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Power lines providing power to the city are not buried • More vulnerable: High elderly population • More vulnerable: High school-age population • More vulnerable: Age of structures and housing stock increases vulnerability • Less vulnerable: Power lines traversing Sanborn Lake were recently replaced • Less vulnerable: City has three official storm shelters • Less vulnerable: Fire department and city residents have equipment to clear debris and branches or move snow • Less vulnerable: City has an inert landfill for debris and branches • Less vulnerable: Adopted state building codes and has enforcement |
| Capability | 3 | <ul style="list-style-type: none"> • Active city council • Lacks technical, administrative and financial resources for mitigation • Relies on county, regional, state and other agencies for assistance • No active education or outreach programs • Lacks resources to accomplish projects independently • 18 first responders with medical supplies living in and around the city • Fire hall has truck for fire suppression and assistance in incidences • Adopted state building codes but lacks enforcement |

8.12.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Valley City.

Problem Statement

The city of Valley City is located on the Sheyenne River which experiences severe riverine flooding. Flooding has impacted the city for decades. The city contains numerous vulnerable populations such as the only assisted living and senior housing developments in Barnes County, dormitory populations at Valley City State University, trailer/mobile home courts, a substantial elderly population, two elementary schools and one of the largest junior high/high schools in the surrounding area. The city has planning and regulatory, administrative and technical, financial, and education and outreach capabilities to accomplish mitigation. However, the city relies on outside sources for construction of permanent flood control measures and upgrading of infrastructure as these projects require millions of dollars in investment.

Education and outreach, permanent flood protection, flood control measures, buyouts of structures in hazard prone areas, education and outreach, and upgrading of critical facilities and infrastructure are a priority for the city.

City of Valley City Project 1: Use Valley City website and local media outlets to improve household disaster preparedness.

| | |
|--------------------------|--|
| Description/Benefit | To keep households ready in case of a disaster. |
| Hazards Addressed | All hazards |
| Affected Jurisdictions | City of Valley City |
| Project Status | New |
| Priority | High |
| Responsible Agency | Valley City City Commission, Valley City City Administrator, Valley City Police Department Chief of Police, Valley City Fire Department Fire Chief Radio Stations: KSJB, KQDJ, KDDR Newspapers: Valley City Times-Record and Litchville Bulletin Digital Media: Bek Communications, CSI, Daktel, DRN, ICTC, Mid-Continent, Qwest, Satellite/DirecTV |
| Partners | NDDES, Red Cross, FEMA, NWS, city & county governments, health districts, social services |
| Timeframe for Completion | Ongoing |
| Cost | \$0 to \$5,000 annually |
| Funding Source | County, state, federal, city, private |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 2: Increase education and awareness of fire safety and prevention.

| | |
|--------------------------|--|
| Description/Benefit | Make the public aware of methods to remain safe from risk of fire and potential prevention methods. Keep areas around buildings and structures clear grass, overgrown vegetation and debris. |
| Hazards Addressed | Urban Fire/Structure Collapse, Wildland Fire |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Valley City Fire District/Department Fire Chief Valley City Fire District/Department Assistant Fire Chief Valley City Fire District/Department Captain |
| Partners | City council, state, federal, local government, EM, ambulance and police, |
| Timeframe for Completion | 6 months – ongoing |
| Cost | \$10,000 to \$15,000 |
| Funding Source | Local, state, federal, private |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 3: Increase awareness of methods for prevention of communicable diseases.

| | |
|--------------------------|---|
| Description/Benefit | Make public aware of risk of communicable diseases and methods for prevention in people; animals and crops for economic impact. |
| Hazards Addressed | Communicable Disease |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and Continue |
| Priority | High |
| Responsible Agency | City-County Health Director |
| Partners | Central Valley Health District, social services, EM, fire departments and districts, county/city government |
| Timeframe for Completion | Ongoing |
| Cost | \$300 for a PSA, \$1,000 to \$3,000/week for substantial outreach/ Free through city website. |
| Funding Source | Grants (state, federal, utilities), County budget. |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 4: Increase awareness of hazardous materials.

| | |
|--------------------------|--|
| Description/Benefit | Make the public aware of risk from hazardous materials and keep informed on current railroad shipping methods, storage sites and weather events. |
| Hazards Addressed | Hazardous Material Release (All) |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and Continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager Valley City Public Works Operations Specialist Valley City Public Works Water Treatment Plant Superintendent Valley City City Administrator Valley City City Commission Valley City Fire District/Department Fire Chief Valley City Fire District/Department Assistant Fire Chief Valley City Fire District/Department Captain Valley City Police Department Chief of Police |
| Partners | State and federal government, EM |
| Timeframe for Completion | Ongoing |
| Cost | Free – through media and city website |
| Funding Source | Local, state, federal, private |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 5: Strengthen building codes and land use regulations.

| | |
|--------------------------|--|
| Description/Benefit | To ensure new and existing structures adhere to building standard to withstand impacts from hazards and to achieve responsible management of land resources. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Valley City |
| Project Status | New |
| Priority | Medium |
| Responsible Agency | Barnes County Planning Commission, Valley City Building/Fire Inspector, Valley City City Commission, Valley City City Administrator, Valley City Police Department Chief of Police, Valley City Fire Department Fire Chief |
| Partners | Dept. of Commerce, league of cities, N.D. Association of Counties, N.D. Township Organization, KLJ |
| Timeframe for Completion | Ongoing |
| Cost | \$2,000 per review |
| Funding Source | Local, state, federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 4 | 5 | 5 | 5 | 34 |

City of Valley City Project 6: Assure new development is built in areas with low risk to hazards.

| | |
|--------------------------|--|
| Description/Benefit | Limit losses of life and property from hazards. To ensure new development can provide highest positive impact to communities. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Valley City Planning Commission, Valley City Building/Fire Inspector, Valley City City Commission, Valley City City Administrator, Valley City Police Department Chief of Police, Valley City Fire Department Fire Chief |
| Partners | Dept. of Commerce, N.D. League of Cities, N.D. Association of Counties, NDTOA, KLJ |
| Timeframe for Completion | Ongoing |
| Cost | \$2,000 per year/review |
| Funding Source | Local, state, federal |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 4 | 5 | 33 |

City of Valley City Project 7: Remove existing structures from flood prone areas.

| | |
|--------------------------|--|
| Description/Benefit | Economic resiliency. Residents with property at risk would be protected. Convert former lots into greenway for improved quality of life. |
| Hazards Addressed | Flood (Overland, Riverine), Geologic Hazard (Landslide) |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Valley City City Commission, Valley City City Administrator, Valley City City Commission, Kadrmas, Lee & Jackson (KLJ) |
| Partners | State Water Commission, FEMA, EM, regional council, WRD |
| Timeframe for Completion | Ongoing |
| Cost | \$75 million |
| Funding Source | State, federal, grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 3 | 5 | 5 | 5 | 5 | 5 | 5 | 33 |

City of Valley City Project 8: Remove existing structures from areas prone to geologic hazards.

| | |
|--------------------------|---|
| Description/Benefit | Economic resiliency. Residents with property at risk would be protected. Convert former lots into open space or wildlife habitat. |
| Hazards Addressed | Flood (Overland, Riverine), Geologic Hazard (Landslides) |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Valley City City Commission, Valley City City Administrator, Valley City City Commission, Kadrmas, Lee & Jackson (KLJ) |
| Partners | Barnes County Commission, state, FEMA, State Water Commission, engineering firms, regional council, EM, WRD |
| Timeframe for Completion | Ongoing |
| Cost | \$50,000 to \$300,000 depending on the property and structure |
| Funding Source | County and city, state, federal, grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 3 | 5 | 5 | 5 | 5 | 5 | 5 | 33 |

City of Valley City Project 9: Encourage participation in NFIP to mitigate impacts of flooding.

| | |
|--------------------------|--|
| Description/Benefit | Economic resiliency. Residents with property at risk would be insured. |
| Hazards Addressed | Flood (Riverine) |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager |
| Partners | Barnes County Commission, city council, state, FEMA |
| Timeframe for Completion | Ongoing |
| Cost | \$500 to \$1,000 per year |
| Funding Source | County and city, state, federal, grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 10: Review of ordinances to assure jurisdictions meet minimum federal and state requirements to comply with NFIP.

| | |
|--------------------------|--|
| Description/Benefit | To ensure program benefits are available to residents and jurisdictions. |
| Hazards Addressed | Flood (Riverine) |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Barnes County Emergency Manager, Barnes County Floodplain Administrator, Valley City City Administrator, Valley City City Commission, Valley City City Inspector |
| Partners | Barnes County Commission, state, FEMA, insurance agents |
| Timeframe for Completion | Ongoing |
| Cost | \$500 to \$1,000 per year |
| Funding Source | County and city, state, federal, grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 11: Construct storm sewer near 9th Avenue NW to calm/slow amount of water flowing into storm sewers to prevent overloading of the system.

| | |
|--------------------------|--|
| Description/Benefit | Reduction of damage to roads from annual flooding to assure emergency access and economic activity year round. |
| Hazards Addressed | Flood (Overland) |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | Medium |
| Responsible Agency | Barnes County Commission, Barnes County Water Resource District, Valley City City Commission |
| Partners | State Water Commission, NDDOT, FEMA |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local and state grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 3 | 2 | 3 | 5 | 3 | 5 | 26 |

City of Valley City Project 12: Construct permanent engineered flood control protection on Sheyenne River in Valley City.

| | |
|--------------------------|---|
| Description/Benefit | To reduce and eliminate river flood damage to property. To reduce impact to telephone poles and power infrastructure/substations. |
| Hazards Addressed | Flood (Riverine), Severe Summer Weather, Severe Winter Weather |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Valley City City Commission |
| Partners | FEMA, KLJ, NDDOT, State Water Commission |
| Timeframe for Completion | 6 to 10 years |
| Cost | \$75 million |
| Funding Source | State Water Commission |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 13: Install storm sewer at 6th Ave SE and Valley Ave SE.

| | |
|--------------------------|--|
| Description/Benefit | To reduce storm water runoff and eliminate overland flooding to downstream properties. |
| Hazards Addressed | Flood (Overland), Severe Summer Weather, Severe Winter Weather |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | Medium |
| Responsible Agency | Valley City City Commission, Valley City Public Works Operations Specialist |
| Partners | State Water Commission, NDDOT, FEMA, KLJ |
| Timeframe for Completion | 6 to 10 years |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 14: Upgrade 4” cast iron water mains to 8” inch water mains.

| | |
|--------------------------|---|
| Description/Benefit | Improve availability of potable water and increase strength of water flow for fire suppression. |
| Hazards Addressed | Urban Fire/Structure Collapse, Wildland Fire |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | High |
| Responsible Agency | Valley City City Commission, Valley City Public Works: Water Dept. |
| Partners | State Water Commission |
| Timeframe for Completion | 10 years |
| Cost | \$10 to \$15 million |
| Funding Source | City |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 15: Upgrade storm sewer mains from Sheyenne River to 10th Ave SW.

| | |
|--------------------------|---|
| Description/Benefit | Reduction of street flooding from heavy rain fall and spring snow melt. |
| Hazards Addressed | Flood (Overland), Severe Summer Weather, Severe Winter Weather |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | Medium |
| Responsible Agency | Valley City City Commission |
| Partners | Valley City State University |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Special assessment |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 4 | 5 | 5 | 5 | 34 |

City of Valley City Project 16: Remove old mill site.

| | |
|--------------------------|--|
| Description/Benefit | To reduce or eliminate health hazards from communicable diseases spawned from buildings in the floodway. |
| Hazards Addressed | Communicable Disease |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | Medium/High |
| Responsible Agency | Valley City City Commission |
| Partners | North Dakota National Guard |
| Timeframe for Completion | 2016 |
| Cost | \$10,000 to \$15,000 |
| Funding Source | North Dakota National Guard, City of Valley City |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 17: Expand inert landfill.

| | |
|--------------------------|---|
| Description/Benefit | To prevent water runoff and infiltration of ground water. |
| Hazards Addressed | Flooding (Overland), Severe Summer Weather, Severe Summer Weather |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | Low |
| Responsible Agency | Valley City City Commission |
| Partners | KLJ, Valley City Public works |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | City |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 35 |

City of Valley City Project 18: Expand Valley City’s sewer lagoon capacity.

| | |
|--------------------------|--|
| Description/Benefit | To accommodate sewer overflows from flooding and avoid environmental contamination and public health issues. The project will be triggered once the population growth of Valley City outpaces capacity of current lagoons. <i>New lagoon cell was specifically built for water treatment plant in 2013.</i> |
| Hazards Addressed | Communicable Disease, Flooding (Overland), Severe Summer Weather, Severe Winter Weather |
| Affected Jurisdictions | City of Valley City |
| Project Status | Ongoing and continue |
| Priority | Low |
| Responsible Agency | Valley City City Commission, Barnes County Commission |
| Partners | Barnes County Emergency Manager, Valley City Public Works |
| Timeframe for Completion | 10+ years |
| Cost | \$1.5 to \$2 million |
| Funding Source | City. State and Federal grants. |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 3 | 5 | 5 | 5 | 5 | 32 |

8.12.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Valley City with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Valley City.

The city of Valley City has an active city council. The city has a full-time chief building official/inspector who also serves as the floodplain administrator/manager. The city is also FEMA flood mapped. The county LEPC serves the city. The city has an ongoing contract with a local engineering firm for engineering and planning services. Emergency management is available through the county. The police chief, city administrator, independent city committees, city beautification committee and various city employees have grant writing and administration capabilities. The local economic development corporation has a full-time grant writer. The city can also contract with the SCDRC for planning, grant writing and grant administration services. For infrastructure maintenance, the city's public works and street departments routinely conduct the following activities: street sweeping, street repair, pot-hole repair, chip-seal and pavement marking maintenance. The public works department also is responsible for mowing of lots and ditches. The city's police department has been deputized by the Barnes County Sheriff's Department. The city contracts with the county emergency manager for services during flood emergencies and occurrences of hazards. The police chief is also certified in incident command system and can train other city staff on the system. The city is also part of the county-wide mutual aid agreement for emergency services. The city has six emergency sirens. The sirens are located at the following locations:

- 900 block of 5th Ave NW
- East of Jefferson Elementary on the 300 block of 12th St. NE near Charlie Brown Baseball Field
- West Main at LaFarge Dakota

- Valley City Public Works Shop
- West Main at the 1000 block
- Grainger Hill near the technology center on the 600 block of 6th St. SE

The city also possesses generators at the following locations:

- Six portable generators at the police station
- One permanent generator at the master lift station
- One permanent generator at the water treatment plant
- One permanent generator at the fire department
- One permanent generator at the police department

The fire ISO rating for the city is four. The city has two wildland fire index signs; one located on west main and the other on east main near the John Deere shop. The police department vehicles have laptops that are air-carded and have mapping capabilities, but do not have automatic vehicle locators installed. The fire department has vehicles and services that are GIS capable. The police chief, fire chief and city staff report hazard data to the emergency manager. The city is not Firewise or StormReady Certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Valley City.

The NDSU/Barnes County Extension Service and City-County Health are based in Valley City and provide education and outreach on hazards. The city maintains a website with hazard education. A website with hazard education is also available through the county. School programs on hazard education are conducted at the elementary schools, junior high/high school and Valley City State University by the county's emergency manager, police chief, fire chief and city officials. The Valley City Police Department Police Chief provides education on active shooter and shelter-in-place at Valley City State University on an annual basis. The Valley City Fire Department District Fire Chief conducts fire safety and prevention at schools on an annual basis. The city also has access to Central Valley Health District for public education on hazards. The annual winter show held in the city and the Barnes County Air Show held every two years at the Barnes County Municipal Airport located on the city's northwest side are events where outreach on hazard education is conducted. The city does not conduct any events specific to hazard education. There are no public-private partnerships providing education and outreach on hazards. However, the city has had discussions with John Deere Seeding Group, the largest employer in the city and Barnes County, to partner with the city to form a public-private partnership to conduct hazard education for employees and the general public. The county's emergency manager conducts education and outreach on hazards in the city at schools, businesses, and city meetings.

Financial

The following narrative details the financial capabilities of the city of Valley City.

The city sets aside revenues for capital improvements and maintains a separate fund. Revenues from the police department through citations and court actions help fund capital improvements. The city has a storm water utility fee of \$1 per month that is placed on resident's utility bill. The city also maintains a separate line item on the budget for storm water funding. The city also maintains a \$5 contingency plan

on sanitary sewer repair and replacement. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city requires developers to fund and install infrastructure such as water/sewer, streets and sidewalks. The city incurs debt through general obligation bonds or special tax bonds for public works and roads. Roads are financed through a general obligation bond, which is paid back through property tax revenue from properties that are either adjacent to or have a direct benefit from the road project. The city issues building permits. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Valley City.

The city has a land use and transportation plan, which includes its comprehensive and strategic plans. The city maintains a capital improvements construction and forecast plan that plans projects 10 years in advance. The city works with the N.D. Department of Transportation on urban roads in Valley City to plan repair and maintenance, and areas needing replacement. The city has a draft of a local emergency operations plan prepared by the police department, which is scheduled for finalizing in late 2014/early 2015. The city has a flood management plan highlighting hierarchies inside each city department and the chain of command internally for each department. The city has a Flood Risk Management Feasibility and Environmental Assessment provided by the U.S. Army Corps. of Engineers, which was county-wide but has a Valley City focus, and a Comprehensive Bank Stability and Restoration Study. The public works department for the city has a water conservation plan consisting of a one-notification system for alerting residents when water rationing is in place. The storm water management plan for the city is operated through public works. The current planning and zoning for existing and new structures requires all storm water to be retained on site and slowly released into the system. The city renews the storm water management plans and planning and zoning ordinances every time a road is either redone or built. The city does not have a continuity of operations or drought management plan. The city has zoning in place and has ordinances that specifically manage development of housing. The city has a planning and zoning commission, which is appointed by the city council, and reports directly to the city commission. The adopted state buildings codes 15 years ago and has a full-time building inspector. The city is FEMA flood mapped and has flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The emergency flood plan also includes flood ordinances and is updated on an annual basis. The city issues permits for building and development. In place of impact fees, the city requires new developments to collect storm water and retain it on site. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

8.13 City of Wimbledon

The profile and inventory, risk assessment and hazard scoring notes, mitigation projects, and capabilities for mitigation are shown in sections 8.13.1, 8.13.2, 8.13.3, and 8.13.4. Figure 8.13.1 shows an aerial view of the city of Wimbledon with the city limits.

Figure 8.13.1 – City of Wimbledon



Source: Barnes County Emergency Management

8.13.1 Profile and Inventory

The location, total population, vulnerable populations, housing units, services, jurisdictional buildings, emergency response services and utilities of the city of Wimbledon. Detailed narratives follow each section heading to profile the city. Additional information on the city of Wimbledon and Barnes County can be found in Chapter 4, Profile and Inventory.

Location

The city of Wimbledon is located on N.D. Highway 9, approximately 40 miles north-northwest of Valley City in Barnes County.

Population

The population is 216 according to the 2010 U.S. Decennial Census.

Vulnerable Populations

According to the 2010 U.S. Decennial Census, the population of the city of Wimbledon consists of 73 individuals under the age of 20, and 29 individuals over the age of 65, representing 33.8 percent and 13.4 percent of the population, respectively.

Housing Units

The 2008 to 2012 American Community Survey 5-Year Estimate shows there is a total of 115 housing units in the city consisting of 94 single-family homes, 21 mobile homes, and no multifamily homes. However, according to meeting participants at the jurisdictional meeting for the city, the former school as converted into five apartment homes sometime after the 2010 U.S. Census.

Services Provided

The city of Wimbledon obtains potable water from Barnes Rural Water District. The city has a sanitary sewer system and lagoon. The city has a storm water system. The city has five lift stations. Three lift stations are for the sanitary sewer system and are located on the north side of town, west side of town and at the lagoon. Two lift stations are for the storm water system and are located on the northeast and southeast corner of town. Central Dakota Sanitation provides garbage services. The city does not maintain an official inert landfill, but tree branch debris is disposed on the northeast side of town behind the water tower. The official newspaper is the Valley City Times-Record.

Jurisdictional Buildings

The city of Wimbledon maintains a city hall/community center, but does not have a county shop, library, swimming pool, airport or golf course. The city has a post office and city shop. The city maintains a park with playground equipment. The city has a library at Barnes County North and community books are also available at the post office. The city does not have an armory, but has an American Legion. The city had a school, which closed and was converted into residential units. There are no county or state government buildings in the city. There are 94 single-family homes, no multifamily units and 21 mobile

homes in the city of Wimbledon as of the 2012 American Community Survey. However, the former school was converted into multifamily housing and consists of six units.

Emergency Response Services

Law enforcement is provided by Barnes County Sheriff. The city does not have any law enforcement buildings. The Wimbledon Fire Department and District provides fire protection to the city and surrounding areas. The fire district has a fire hall. The city has 12 first responders, which are based in the fire hall. Ambulance service is provided by Barnes County and the city of Jamestown.

Utility Providers

Potable water is provided by Barnes Rural Water District. Electricity is provided by Otter Tail Power. Natural gas is not available in the city of Wimbledon. Fuel oil and propane are used as an alternative heating source and is provided by companies chosen by the individual consumer. Daktel and Mid-continent provide phone and internet. There is not a cable TV provider in the jurisdiction. Individual homes may choose to subscribe to direct broadcast satellite service providers or use an antenna to receive over the air programming.

8.13.2 Risk Assessment and Hazard Scoring Notes

Table 8.13.2 summarizes the risk assessment scoring of the city of Wimbledon. The risk assessment and hazard scoring notes from the jurisdictional meeting for each hazard are shown after Table 8.13.2.

Table 8.13.2 – City of Wimbledon Jurisdiction Risk Assessment Scoring Summary

| Risk Assessment | | | Jurisdiction: | Wimbledon | | |
|--|---------------|------------------|----------------------|----------------------|---------------------|--------------|
| <u>Hazard</u> | <u>Impact</u> | <u>Frequency</u> | <u>Likelihood</u> | <u>Vulnerability</u> | <u>Capabilities</u> | <u>Total</u> |
| Communicable Disease | 4 | 2 | 3 | 2 | 2 | 9 |
| Dam Failure | NA | NA | NA | NA | NA | NA |
| Drought | 4 | 3 | 3 | 4 | 2 | 12 |
| Flood | 2 | 3 | 3 | 2 | 2 | 8 |
| Geologic Hazard | NA | NA | NA | NA | NA | NA |
| Hazardous Material Release | 4 | 2 | 4 | 4 | 2 | 12 |
| Homeland Security Incident | 4 | 2 | 2 | 4 | 1 | 11 |
| Severe Summer Weather | 3 | 3 | 3 | 3 | 2 | 10 |
| Severe Winter Weather | 4 | 4 | 4 | 3 | 2 | 13 |
| Shortage or Outage of Critical Materials or Infrastructure | 4 | 3 | 3 | 4 | 2 | 12 |
| Transportation Accident | 4 | 3 | 4 | 4 | 2 | 13 |
| Urban Fire/Structure Collapse | 4 | 2 | 3 | 3 | 3 | 9 |
| Wildland Fire | 4 | 3 | 2 | 2 | 3 | 8 |
| Windstorm | 4 | 4 | 4 | 3 | 1 | 14 |

(Formula: Impact + Frequency + Likelihood + Vulnerability – Capabilities = Total)

Communicable Disease

Including Human, Animal, and Plant Diseases.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of economy, crops or livestock • Some people get sick each year, possible death • 80 percent of income comes from crops |
| Frequency | 2 | <ul style="list-style-type: none"> • Some people get sick each year • Some crop loss and localized livestock loss |
| Likelihood | 3 | <ul style="list-style-type: none"> • Installed storm sewer 15 years ago • Some back yards have standing water if not pumped out independently by residents • Abandoned buildings • Absentee-owner buildings |
| Vulnerability | 2 | <ul style="list-style-type: none"> • There are 73 people under the age of 20 and 29 people over the age of 65 in the city representing 33.8 percent and 13.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance if an outbreak did occur. • More vulnerable: Children – around 25 • More vulnerable: Abandoned buildings • More vulnerable: Absentee-owner buildings • More vulnerable: Some back yards have standing water • More vulnerable: No clinic, county ambulance • Less vulnerable: Crop insurance • Less vulnerable: Mowing of empty lots is done • Less vulnerable: City sprays for mosquitos |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic or hospital, no ambulance • Internet connections, TV, etc. • First responders have medical supplies, but not a stock pile • Special assessment to owners of lots needing mowed • Fire department does not have pumping equipment but city does |

Dam Failure

A dam failure is defined as a sudden, rapid, and uncontrolled release of impounded water that will create a potential significant downstream hazard.

Dam Failure does not apply to the city of Wimbledon.

Drought

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of crop, livestock, economy, lost jobs, casualties (possible) • Increased fire hazards-overland fire, risk to buildings • Higher cost to cool homes, increased utilities • Lower water supplies/water shortages • Impacts local food supplies. • Full blown drought would devastate age economy |
| Frequency | 3 | <ul style="list-style-type: none"> • 1988 • Some dry conditions each year, couple weeks in length. • In 2013, dry conditions for June to October - little to no rain |
| Likelihood | 3 | <ul style="list-style-type: none"> • Weather patterns are cyclical, weather patterns unpredictable. • Not a lot of drain tile in the area – however farmers are started to install • Not much irrigation • Some large bodies of water needing attention, water levels are dropping |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: All on Barnes Rural Water • More vulnerable: City well still provides water, but not treated • More vulnerable: Elderly population – high population • More vulnerable: 25 children • More vulnerable: Backup water cannot help with crops • Less vulnerable: Water tower backup supply of water • Less vulnerable: 10,000 gallon backup down at water plant • Less vulnerable: Water at elevator |
| Capability | 2 | <ul style="list-style-type: none"> • Water from Barnes Rural Water District • City installed storm sewer with grant from the state • Active city council • No plans in place |

Flood

Including River Flooding, Overland Flooding, Ice Jams, and Flash Floods.

| | | |
|------------------|---|---|
| Impact | 2 | <ul style="list-style-type: none"> • Blocked roads in the city-temporarily • Increased mosquitos-many transmit disease due to lots of grass and debris laying around • Basement have become flooded • Residents have sump pumps running 24/7 • Large property loss, vehicles, personal property • Some casualties • Not much water and flood damage to buildings |
| Frequency | 3 | <ul style="list-style-type: none"> • Only happens when a lot of precipitation or snow in the winter • Depends largely on the weather • Sump pumps are constantly running • High water table |

| | | |
|----------------------|---|--|
| | | <ul style="list-style-type: none"> • Heavy rain fall event once a year |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavy spring melting to heavy rains occurs yearly • Has storm water system, is not likely • High water table • Heavy rains annually • Lift stations pump out water, sometimes needs time to catch, capacity somewhat low |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: High water table • More vulnerable: Large elderly population • More vulnerable: Lower capacity of lift stations, can become overwhelmed • More vulnerable: City park experiences ankle-high flooding frequently |
| Capability | 2 | <ul style="list-style-type: none"> • Lack of manpower by the city and general public • National Guard for help • city has equipment to pump water • no city plans or ordinances in place • elevator has pump • has lift stations |

Geologic Hazard

A landslide is the movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

Geologic Hazard does not apply to the city of Wimbledon.

Hazardous Material Release

Hazardous material are any substance in any quantity or form that may pose an unreasonable risk to the safety, health, environment, and property of citizens.

| | | |
|-------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, crops and livestock • Loss of economy • Potential for fire as a secondary impact • Blocked road, loss of transportation mobility • Explosion causing mass property loss from oil trains |
| Frequency | 2 | <ul style="list-style-type: none"> • Never had any major occurrences |
| Likelihood | 4 | <ul style="list-style-type: none"> • People have propane tanks in town on their properties for heating • Trucks transporting larger tanks, carrying more chemicals • Truck route around the city, no one ever uses • Agroline anhydrous tanks and others • No real increase in truck traffic-decreases because Cenex moved seed plant out of town • Heavy traffic at harvest time • Signed contract with ethanol plant at Spiritwood will increase traffic • Increase in oil trains |

| | | |
|----------------------|---|--|
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No communication other than cell phones – good service in the area • More vulnerable: Chemicals stored in the city • More vulnerable: Elderly population • More vulnerable: Small size-would impact all areas of the city • More vulnerable: Agroline anhydrous tanks right on highway 9-vulnerable to transportation accident • More vulnerable: Oil trains traversing right through the city - CP rail line • More vulnerable: Cenex located right in town for refueling-encouraged to come into town empty |
| Capability | 2 | <ul style="list-style-type: none"> • First responders have supplies, but no stock pile • People are not signed up for Code Red • Covered by Barnes County Ambulance • Hazardous/truck route – • No plans, financial • Agroline has safety education for employees and Cenex as well • Crossing arms at railroad |

Homeland Security Incident

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.

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Mass casualties, economic losses, widespread panic • Loss population |
| Frequency | 2 | <ul style="list-style-type: none"> • No incidents have occurred |
| Likelihood | 2 | <ul style="list-style-type: none"> • No major employers • Not a population center • No school in the city • No dense or large population in the area |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Small town, everyone is impacted, fearful, anxious • More vulnerable: Unstable populations – some people have threatened – family • More vulnerable: Train line right through town • More vulnerable: Alliance pipeline right north of town-1.5 miles north, combination of chemicals • Less vulnerable: Right off a highway - evacuation route |
| Capability | 1 | <ul style="list-style-type: none"> • Community hall and fire hall for gathering of residents • Sheriff’s department – Barnes • No evacuation plans |

Severe Summer Weather

Including Downburst/Strong Winds/Straight-Line Winds, Extreme Heat, Hail, Lightning, and Tornadoes.

| | | |
|----------------------|---|--|
| Impact | 3 | <ul style="list-style-type: none"> • Hail damage to homes, loss of power, fallen trees and debris • Property damage to community buildings • Lighting strike could cause a fire to buildings • Loss of life, injury • Cars become stalled • Streets can become soggy from moisture • Straight-line winds can cause damage to buildings • Lightning strike to power pole and trees. Power outages can occur • Tree/branches landing on buildings causing damage • Possible displacement of an estimated 39 people based on an average household size of 1.88 people and 21 mobile home structures |
| Frequency | 3 | <ul style="list-style-type: none"> • Heavy rain and storms from time to time during summer months • Couple high winds and strong storms per summer season |
| Likelihood | 3 | <ul style="list-style-type: none"> • Heavier rains – 3 to 4 inches now instead of 1 or 2 • Removal of shelter belts allowing more direct wind |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 73 people under the age of 20 and 29 people over the age of 65 in the city representing 33.8 percent and 13.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Roads can become blocked-heavy rains, trees, blown debris. • More vulnerable: Limit access for emergency services • More vulnerable: Lack of paved streets • More vulnerable: Lack of manpower • More vulnerable: Elderly population • More vulnerable: Trailer homes • More vulnerable: Abandoned buildings – former hotel • More vulnerable: Emergency siren – can be set off manually, has yet to be tested |
| Capability | 2 | <ul style="list-style-type: none"> • Inert landfill/field for debris • Fire department has equipment • No building codes • First responder & EMT • Fire hall, community hall • Emergency siren – can be set off manually, has yet to be tested • No evacuation plan, financial, etc. |

Severe Winter Weather

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

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Heavy snow, blocked roads, power outages • Isolation of the community • Severe low temperatures-increase utility costs • Loss of life, injury, loss of economy • Low temperatures may affect alternative fuel sources • Increased cost for snow removal if we have heavy snow. • Highways can become icy reducing mobility speeds, transportation accident • Heavy precipitation results in melting and potential flooding in the spring • Snow and ice build ups on power lines, causing outages • Possible displacement of an estimated 39 people based on an average household size of 1.88 people and 21 mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Happens yearly, weather and climate in the area • High winds and ground blizzard conditions |
| Likelihood | 4 | <ul style="list-style-type: none"> • Will happen in the future due to our climate. • Removal of shelter belts and vegetation leads to more ground blizzard conditions • Fire chief cannot condemn buildings, state fire marshal has to do it |
| Vulnerability | 3 | <ul style="list-style-type: none"> • There are 73 people under the age of 20 and 29 people over the age of 65 in the city representing 33.8 percent and 13.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • More vulnerable: Trailer homes • More vulnerable: Lack of paved streets • More vulnerable: Can block the access to town, block roads • More vulnerable: Fire chief cannot condemn buildings, state fire marshal has to do it, the ability of fire chief was taken away • More vulnerable: Elderly population • Less vulnerable: Good roads leading in and out of town • Less vulnerable: Good city shop located in the city • Less vulnerable: Gas station and grocery store • Less vulnerable: Some residents have alternative sources of heat |
| Capability | 2 | <ul style="list-style-type: none"> • Local residents do snow removal-county is effective as well • Some residents have alternative sources of heat • Fire hall and community center • no state building codes • no evacuation plan • no plans in place, or financial |

Shortage or Outage of Critical Materials or Infrastructure

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

| | | |
|----------------------|---|--|
| Impact | 4 | <ul style="list-style-type: none"> • Long periods of time without power or water could lead to loss of life • Power outages-biggest concern, lift stations could be incapacitated, water backup into homes, property damage, potential loss of life, sanitary sewer could back up into homes • Elderly individual impacted from loss of electric and medical supplies • Reduced mobility • Limited drinking water • Costly to the city to take care of the issue |
| Frequency | 3 | <ul style="list-style-type: none"> • Power outages-not long lasting, mostly momentary, up to 2 or 3 hours, 3 to 4 times a year • Never an issue with water • Never any issues with food, people stock up |
| Likelihood | 3 | <ul style="list-style-type: none"> • County clears roads-does real well • Some residents has their own generator • City has portable generator • Clearing of street is done by local residents as well • City has own maintainer • No improvements to power infrastructure planned, no burying of lines • Has gas station, has grocery |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: Long response time for ambulance, police, fire • More vulnerable: Elderly population and getting medication • More vulnerable: Trains blocking streets in town limiting mobility – lack of grade separated crossings • Less vulnerable: Water tower, back up tank of 10,000 gallons • Less vulnerable: Some people grow local food supply – few |
| Capability | 2 | <ul style="list-style-type: none"> • Some equipment of local residents to remove snow, water, etc. • County is good at clearing Highway 9 • Fire department has equipment • No evacuation plan, no financial |

Transportation Accident

Including Vehicle, Railway, Bus, and Aircraft Accidents.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of property such as cars, trucks, etc. • Result in HAZMAT • Result in fires of buildings and equipment and vehicles • Could have explosion from oil train, derailments, etc. • People could be killed with collisions |
| Frequency | 3 | <ul style="list-style-type: none"> • Nothing major in the area in recent years • Last summer, 3 motorcycles and a pickup crashed • Lost lift last year-alcohol related |
| Likelihood | 4 | <ul style="list-style-type: none"> • Frequently patrolled by county sheriff - decreases speeding & likelihood, depends on election year or not • Gravel roads, unpaved streets, heavy traffic • Dust from truck traffic lingers, reduces visibility • Train line through the city • Oil trains |
| Vulnerability | 4 | <ul style="list-style-type: none"> • More vulnerable: No airport • More vulnerable: No local ambulance, response times from Barnes County prolonged • More vulnerable: No local police • More vulnerable: Hospitals and medical clinics are far away • More vulnerable: Lack of paved streets-soggy roads, pot holes • More vulnerable: Elderly population • More vulnerable: Lack of street signage, cross walks, sidewalks • More vulnerable: Speeding on highway 9 through town, curve reduces visibility • Less vulnerable: Sheriff is good at patrolling county highway 9 |
| Capability | 2 | <ul style="list-style-type: none"> • No clinic or local ambulance • First responders have supplies, but no stockpile • People have large trucks, tractors, equipment-farmers mostly • Cell phones for immediate calls for help-better communication • No evacuation plans, financial backup • Fire department is certified extraction |

Urban Fire/Structure Collapse

Including Urban Fire/Structure Collapse.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, property, vehicles, personal possessions • Loss of economy • Lose community asset/buildings • Abandoned buildings, could lead to other buildings on fire, could spread |
| Frequency | 2 | <ul style="list-style-type: none"> • No real incidents • Structural fire, lost single-family home last fall 2013 • Garage fire |
| Likelihood | 3 | <ul style="list-style-type: none"> • Abandoned buildings, not well kept • Vegetation can become dry from drought and cause a building to fire, mostly down on large lot with debris • Installation of hydrants lowers vulnerability • Fire department with equipment • Old buildings and electrical outdated, old wiring |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Lack of alternative housing-residents will take them in however. • More vulnerable: Distance from neighboring fire departments can lead to more issues, bigger impact, etc. • More vulnerable: Small size of town and spacing of residential structures reduces risk, however buildings on main street are close together and hazardous • More vulnerable: Abandoned buildings, not well kept • Less vulnerable: Fire department with equipment • Less vulnerable: Residents yards are well kept • Less vulnerable: Helping hand of farmers-have backup water, transport water around quickly • Less vulnerable: No more CRP near the city • Less vulnerable: Water supplies for backup until Rural Water comes in |
| Capability | 3 | <ul style="list-style-type: none"> • Fire department with truck and equipment • No building codes • first responders • water tower for backup • 10,000 tank • Hook to city well for backup water • Active city council • Fire department of 10 • Mutual aid from county • District has levy taxes • County mutual aid |

Wildland Fire

Including Wildland Fire and Rural Fire.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Loss of life, injury, loss of economy • Loss of farm equipment, structures • Could result in HAZMAT • Property loss from fires • Health hazard due to poor air quality • Loss of wildlife habitat • Small size of town-everyone could be impacted |
| Frequency | 3 | <ul style="list-style-type: none"> • Farmers do much control burning, very slim chance of becoming uncontrollable • No reports of lightning impacting • Railroad and hot bearings have started |
| Likelihood | 2 | <ul style="list-style-type: none"> • Lack of fire break around the city • Dry conditions each year for a couple weeks, strong winds • No more CRP • Grassland surrounds the city • Farmers respond and do fire breaks if needed with equipment • Controlled burns each year, can become out of control |
| Vulnerability | 2 | <ul style="list-style-type: none"> • More vulnerable: Lack of manpower. Prolonged response from surrounding fire districts • More vulnerable: Windy conditions each year • More vulnerable: Trailer homes • More vulnerable: Lack of fire break • Less vulnerable: No CRP • Less vulnerable: City well for backup • Less vulnerable: Water tower • Less vulnerable: County mutual aid |
| Capability | 3 | <ul style="list-style-type: none"> • Fire department with truck and equipment • no building codes • first responders • water tower for backup • 10,000 tank • Hook to city well for backup water • Active city council • Fire department of 10 • Mutual aid from county • District has levy taxes • County mutual aid |

Windstorm

Including high wind events that occur separately from tornados and severe thunderstorms.

| | | |
|----------------------|---|---|
| Impact | 4 | <ul style="list-style-type: none"> • Property damage, broken windows, flying shingles • Toppled trees, uprooted • Loss of life, injury • Loss of crop and livestock • Loss of power • Could start a fire of buildings and structures, could allow grass fire to spread • Possible displacement of an estimated 39 people based on an average household size of 1.88 people and 21 mobile home structures |
| Frequency | 4 | <ul style="list-style-type: none"> • Occurs throughout the year in all weather conditions • Straight line winds mostly in summer months, tree debris • Spring is when wind is strongest |
| Likelihood | 4 | <ul style="list-style-type: none"> • Removal of tree rows allows for wind to impact city more directly • Cyclical weather patterns could increase or decrease • Lack of buildings on west side of city-wind has direct access into town |
| Vulnerability | 3 | <ul style="list-style-type: none"> • More vulnerable: Power lines in town not buried-power outages • More vulnerable: No redundancy in power grid • More vulnerable: Larger old trees, cottonwoods are older and more susceptible • Less vulnerable: Fire hall for shelter |
| Capability | 1 | <ul style="list-style-type: none"> • There are 73 people under the age of 20 and 29 people over the age of 65 in the city representing 33.8 percent and 13.4 percent of the total population, respectively, and are considered most vulnerable to the hazard and could need assistance in an emergency. • No state building codes • Inert landfill/field • Residents that have equipment for cleanup • Fire department has equipment • Lack of manpower in general due to small size • No evacuation plan • Independent nature of residents • No infrastructure programs |

8.13.3 Mitigation Strategy

This update of the Barnes County Multi-Jurisdictional Multi-Hazard Plan includes a mitigation strategy consisting of six goals in Chapter 6. The following problem statement and mitigation projects address the mitigation needs of the city of Wimbledon.

Problem Statement

Severe summer weather and severe winter weather produce heavy precipitation in the city of Wimbledon. Due to spring melt of snow the lack of a drainage maintenance schedule for existing ditches, the city is vulnerable to flooding. Windstorms are frequent in the area, which block roads due to snow drifts and various debris, and cause power outages. The city adopted revised trailer park ordinances due to the large amount of trailer homes. With little to no additional capabilities, the city is dependent on outside sources for mitigation.

Improved drainage, installation of generators for backup power and a storm shelter are a priority for the city.

City of Wimbledon Project 1: Create and implement drainage ditch maintenance system for existing drainage ditches in the city.

| | |
|--------------------------|---|
| Description/Benefit | Maintain flow of runoff to eliminate standing water blocking roads to maintain access for city residents and emergency services and continued operation of public infrastructure. Control growth of vegetation to minimize fire hazard and spread of disease. |
| Hazards Addressed | Communicable Disease, Drought, Flood (Overland), Severe Summer Weather, Severe Winter Weather, Transportation Accident, Fire, Windstorm |
| Affected Jurisdictions | City of Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | Wimbledon City Council, Barnes County Emergency Manager, Barnes County Water Resource District Manager |
| Partners | State Water Commission, NDDOT, township board |
| Timeframe for Completion | Ongoing |
| Cost | TBD |
| Funding Source | Local, state and federal grants |

| | | | | | | | |
|--|-----------|----------------|-----------|-------|----------|---------------|-------|
| Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost. | | | | | | | |
| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
| 5 | 5 | 5 | 3 | 3 | 5 | 5 | 31 |

City of Wimbledon Project 2: Install permanent generators for the city lift station and community center.

| | |
|--------------------------|--|
| Description/Benefit | Establish permanent source of backup power to maintain continued operation of the sanitary sewer system to ensure resiliency. To maintain continued operation of the community center as unofficial shelter. |
| Hazards Addressed | All |
| Affected Jurisdictions | City of Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | Wimbledon City Council, Barnes County Emergency Manager |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council |
| Timeframe for Completion | 3 years |
| Cost | Project specific |
| Funding Source | Local, state, federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 5 | 4 | 5 | 5 | 5 | 5 | 34 |

City of Wimbledon Project 3: Construct storm shelter.

| | |
|--------------------------|--|
| Description/Benefit | To reduce or eliminate injury and death from severe weather. |
| Hazards Addressed | Flood, Severe Summer Weather, Severe Winter Weather, Fire, Windstorm |
| Affected Jurisdictions | City of Wimbledon |
| Project Status | New |
| Priority | High |
| Responsible Agency | Wimbledon City Council, Barnes County Emergency Manager, Barnes County Commission |
| Partners | Emergency agencies (ambulance, fire, police), engineering firms, regional council, NDDDES, Red Cross |
| Timeframe for Completion | 3 to 5 years |
| Cost | Up to \$75,000 |
| Funding Source | County, state and federal grants |

Values: 1 is low, indicated a negative impact and/or too costly. Value of 5 is high, indicated positive impact and or higher benefit compared to cost.

| Social | Technical | Administrative | Political | Legal | Economic | Environmental | TOTAL |
|--------|-----------|----------------|-----------|-------|----------|---------------|-------|
| 5 | 4 | 4 | 5 | 5 | 5 | 5 | 33 |

8.13.4 Mitigation Capability Assessment

Capability for mitigation is divided into four categories: Administrative and Technical, Education and Outreach, Financial, and Planning and Regulatory.

Administrative and Technical: Identification of administrative and technical capabilities, which include: staff, their skills and tools for mitigation planning to implement specific mitigation actions.

Education and Outreach: Identification of education and outreach programs, and methods already in place to implement mitigation activities and communicate hazard-related information.

Financial: Identification of access to or eligibility to use funding resources for hazard mitigation for jurisdictions.

Planning and Regulatory: Jurisdictional plans, policies, codes, and ordinances adopted and in place that prevent and reduce the impacts of hazards.

Each identified resource in the four categories can be used to implement mitigation strategies and access funding for projects. Information on the capabilities of the city was gathered at its jurisdictional meeting, committee meetings, and interviews during the planning process. Tables comparing the mitigation capabilities of the city of Wimbledon with all other jurisdictions in the county can be found in Chapter 7, County Mitigation Capability Assessment.

Administrative and Technical

The following narrative details the administrative and technical capabilities of the city of Wimbledon.

The city of Wimbledon has an active city council. The city does not have a chief building official or inspector. The county LEPC serves the city. The county emergency manager is the floodplain administrator/manager. The city is not flood mapped and the county emergency manager is the floodplain administrator/manager. Emergency management is available through the county. The city can contract with the SCDRC or a private firm for planning, grant writing and grant administration services. However, the auditor and mayor have grant writing and administration capabilities. The city conducts mowing of city and vacant lots with the cost special assessed to the lot owner. All other infrastructure maintenance programs are done on an as-needed basis. The city is part of the county-wide mutual aid agreement for emergency services. The city has an emergency siren located at the community center. The city owns one portable generator, which is stored at Agroline. The fire ISO rating for the city is eight. The city does not have a fire index sign. The fire responder vehicle is GPS capable, but all other emergency service are not GIS capable. The first responders use smart phones and are working with neighboring Stutsman County to get usable maps on the phones. It is unknown if hazard data is reported to the emergency manager. The city is not Firewise or StormReady Certified.

Education and Outreach

The following narrative details the education and outreach capabilities of the city of Wimbledon.

The city does not have non-profit organizations providing education on hazards, but has access to the NDSU/Barnes County Extension Service. The city does maintain a website with hazard education. A

website with hazard education is also available through the county. There is not a school located in the city and therefore no school programs targeting hazard education are available. However, Barnes County North is located southeast of the city approximately eight miles where education and outreach is provided to students. Agroline and Cenex conducts hazard education for employees, but not the general public. The city also has access to the NDSU/Barnes County Extension Service, Central Valley Health District and City-County Health for public education on hazards. The annual winter show held in Valley City and the Barnes County Air Show held every two years at the Barnes County Municipal Airport are events where outreach on hazard education is conducted. The city does not conduct events on hazard education. There are no public-private partnerships providing education and outreach on hazards. The county's emergency manager conducts education and outreach on hazards in the city.

Financial

The following narrative details the financial capabilities of the city of Wimbledon.

The city does not set aside tax revenue for capital improvements and only has a general fund. The city does not have storm water utility fee as it lacks a storm water system. The city charges a monthly sanitary sewer fee of \$8, plus \$1.15 per thousand gallons of water on the water/sewer garbage bill. The city does not levy special assessments for new development, but has the ability to do so if warranted. The city has not incurred any debt through general obligation bonds or special tax bonds, but also has the ability to do so if warranted. The city issues building permits. The city has access to CDBG funds through the SCDRC. The city does not have any private entities providing funding for mitigation. The surrounding township and county school districts are other sources of funding for mitigation.

Planning and Regulatory

The following narrative details the planning and regulatory capabilities of the city of Wimbledon.

The city does not have a comprehensive, strategic, capital improvements, land use, storm water, water conservation or drought management plan. The city is included under the county's local emergency operations plan and flood management plan, and the county road department's transportation plan. The city does not have a continuity of operations plan. The city has zoning in place as of 2009. The city does not have impact fees but does have trailer park subdivision ordinances in place. The city issues building permits for development. The city council serves as the planning commission for the city. The city has not adopted state building codes and does not have an inspector. The city is not FEMA flood mapped and does not have flood ordinances. The city does not have a flood damage reduction study, but does have a flood insurance study. The city is covered under the County's Pandemic Influenza Response Plan.

Plan Maintenance

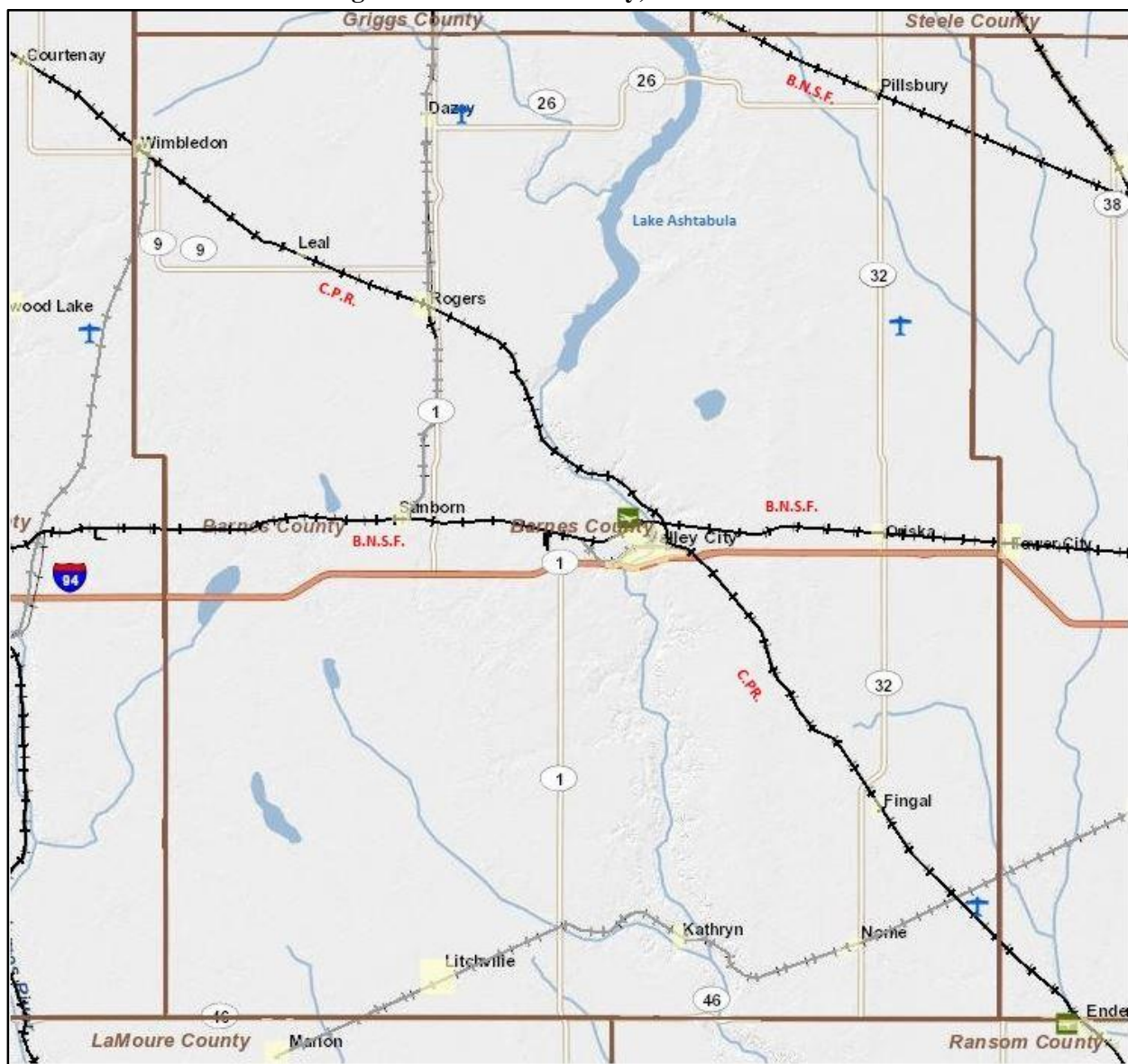
An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Plan maintenance ensures the plan will remain useful in the county for many years. A mitigation action progress report form to conduct plan maintenance is located in Chapter 10 of this plan.

9. Maps

Maps provide visual illustrations of the geography of the Barnes County and assist in mitigation by providing details of the inventory of the county, where critical facilities and infrastructure are located, geographic coverage of emergency services, and each incorporated jurisdiction. Maps are drawings, depictions, and illustrations and are commonly referred to as figures in planning documents.

Figure 9.1 is of Barnes County and illustrates where each jurisdiction is located in reference to one another; national, state and county highways; railroads; and bodies of water and rivers. Information on the transportation system, including freight railroad, bridges and airports is important for understanding the transportation system and potential risk involved with transportation accidents, among other hazards.

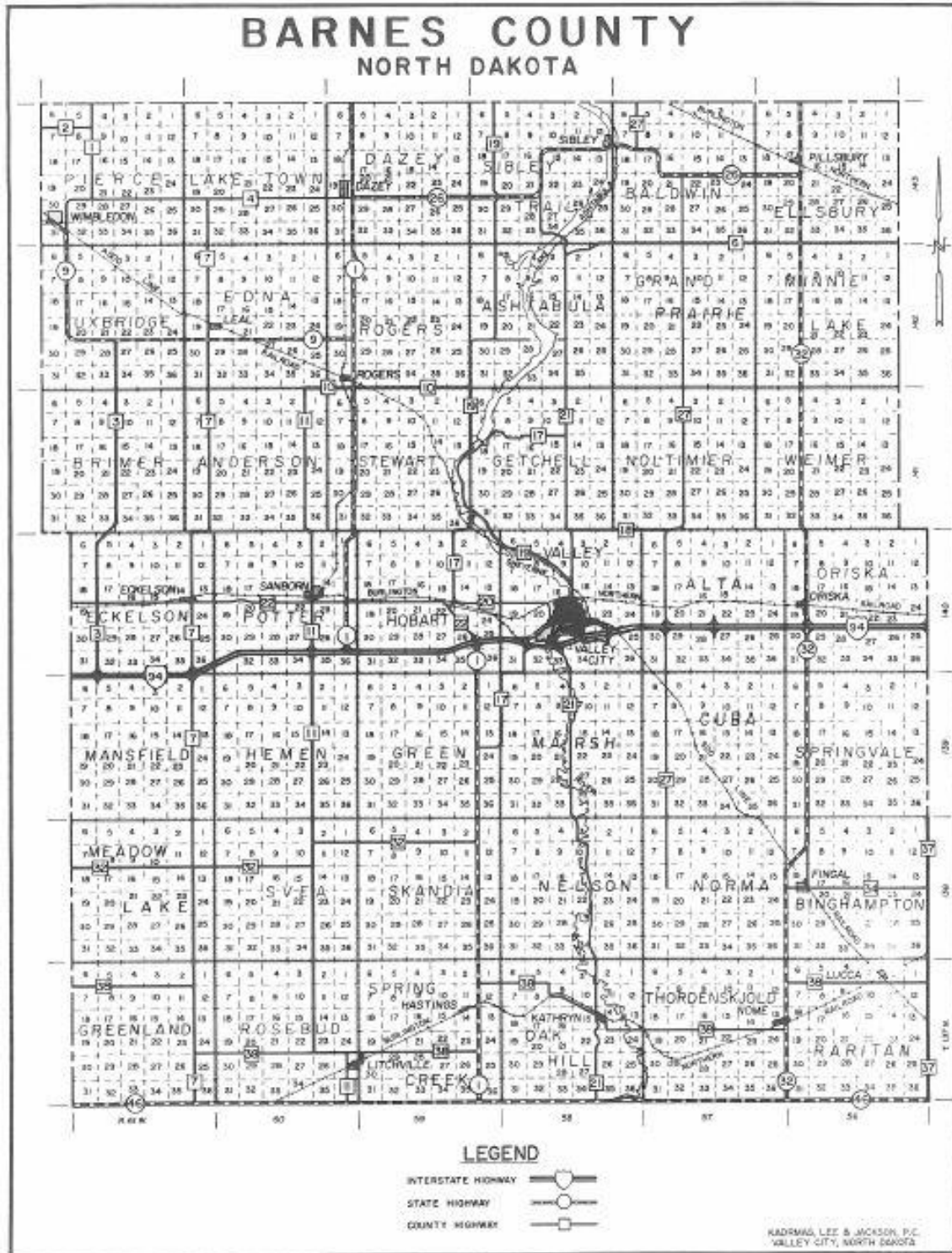
Figure 9.1 – Barnes County, North Dakota



Source: North Dakota Geographic Information Systems

Figure 9.2 illustrates Barnes County Townships in relation to national, state and county highways; railroads; and bodies of water and rivers.

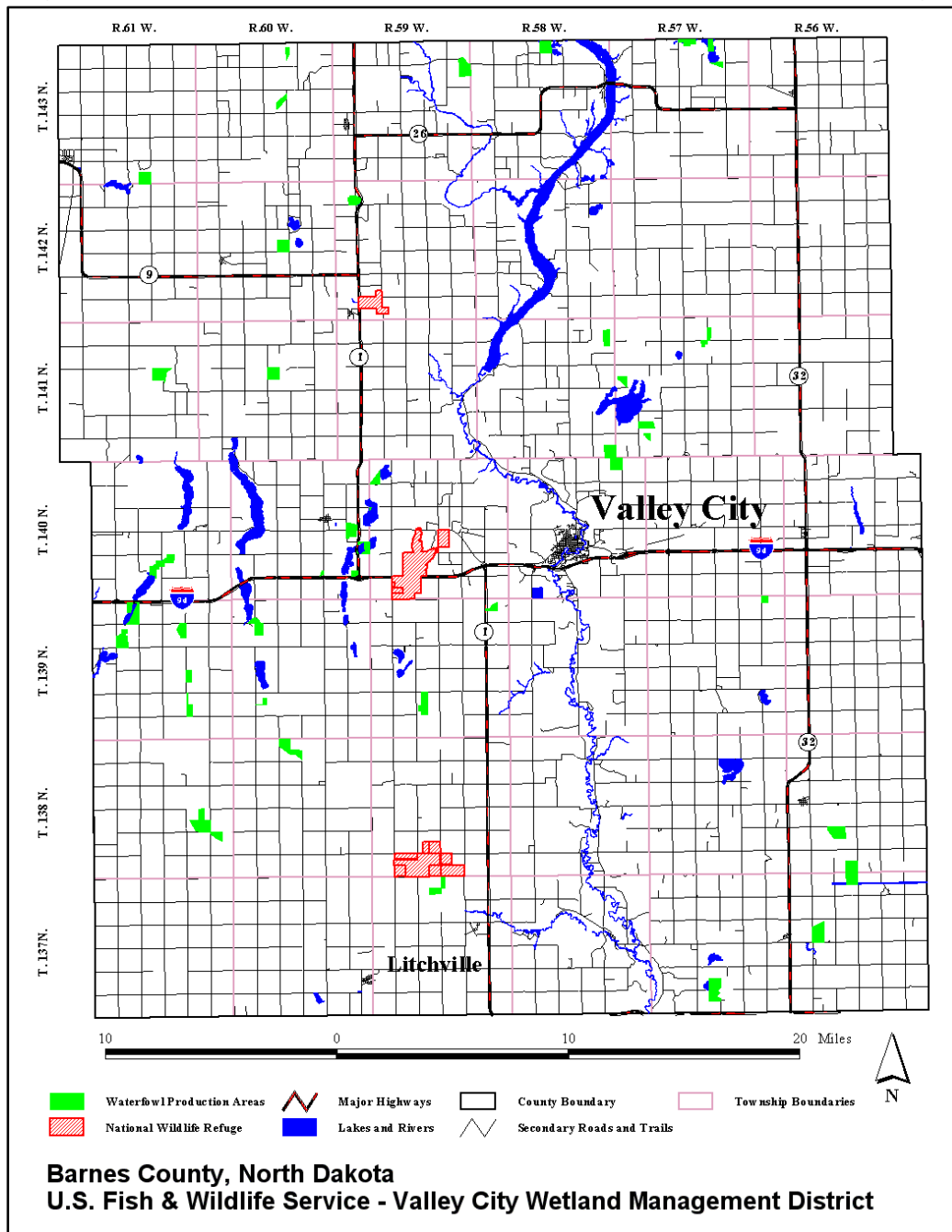
Figure 9.2 – Barnes County Townships



Source: Barnes County Auditor's Office

Figure 9.3 is a map of the waterfowl production areas (WPAs) in Barnes County under management of the Valley City Wetland Management District. These unique areas are key assets to the development, growth and sustainability of the tourism industry. They also limit some industrial development projects that could damage these areas and their missions. It is important to understand the extent and location of WPAs for mitigating hazard such as hazardous material release by restricting agriculture and industrial development in environmentally sensitive areas.

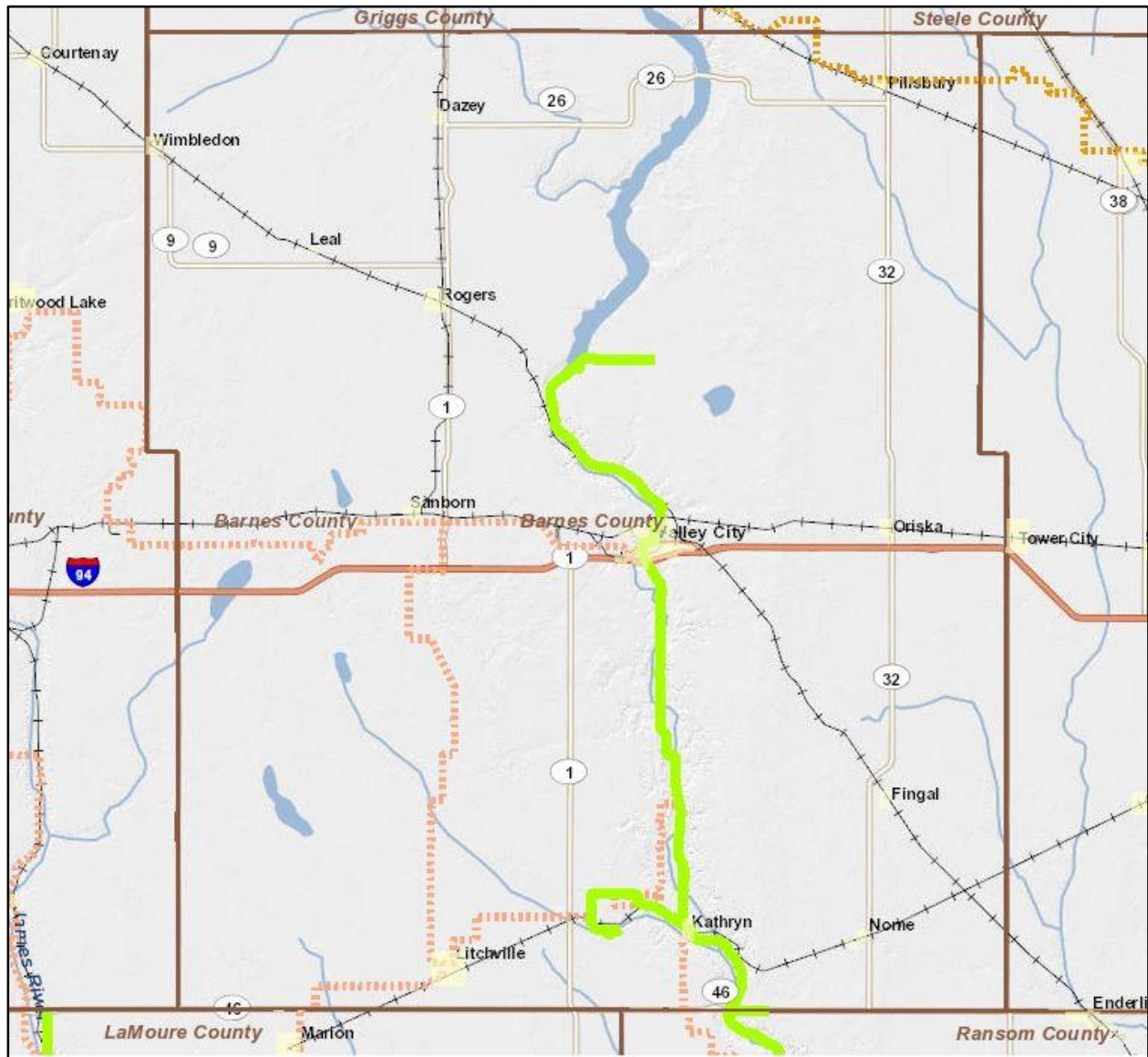
Figure 9.3 – Barnes County Waterfowl Production and National Wildlife Refuges



Sources: U.S. Fish & Wildlife Service, South Central Dakota Regional Council Comprehensive Economic Development Strategy

Figure 9.4 shows the location of the Sheyenne River Valley National Scenic Byway in Barnes County. The extent of the byway is highlighted in green. The byway extends from Ransom County on the south through Barnes County. The byway was recently extended into Griggs County to the north. This extension is not represented in the map below. In addition, snowmobile routes are marked by the dashed orange and red lines.

Figure 9.4 – Sheyenne River Valley National Scenic Byway



Source: North Dakota Geographic Information Systems

Figures 9.5 and 9.6 show the location of official storm shelters in Barnes County and Valley City. Understanding the locations of official storm shelters in the county is important for mitigation to eliminate or reduce loss of life or injury.

Figure 9.5 – Barnes County Storm Shelter Locations

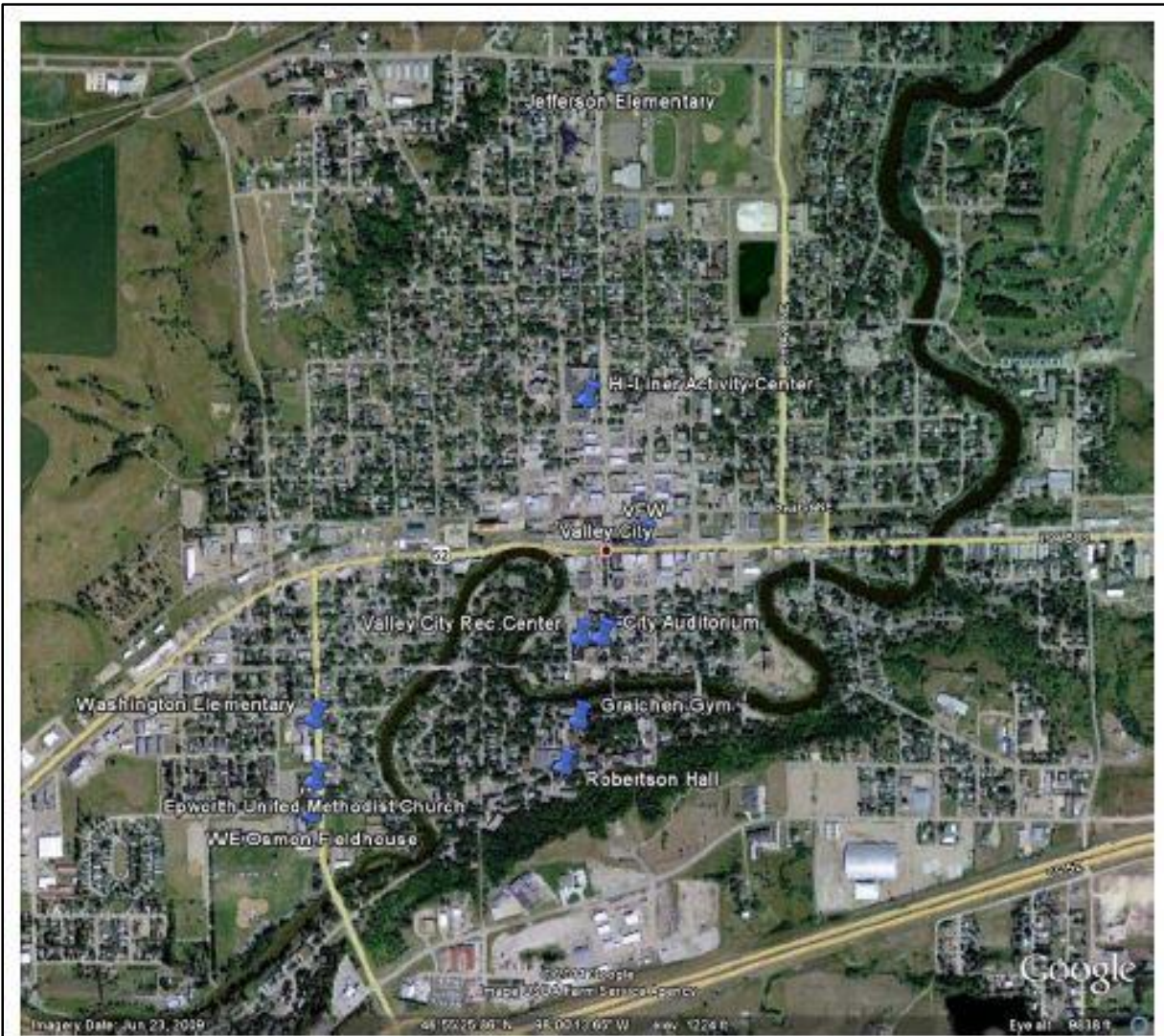


Rural Barnes County Shelters:

- Dazey City Hall, 1708 11 the Ave. SE, Dazey
- Barnes County North School, 10860 20 ½ St. SE, Rogers
- Sanborn Community Center, 603 5th Ave., Sanborn
- Oriska Elementary School, 502 2nd Ave., Oriska.....Capacity of 150
- Holy Trinity Church, 419 1st St., Fingal.....Capacity of 100
- Litchville Elementary, 304 6th Ave., Litchville.....Capacity of 250

Sources: Barnes County Emergency Operations Plan, Barnes County Emergency Management

Figure 9.6 – Valley City Storm Shelter Locations



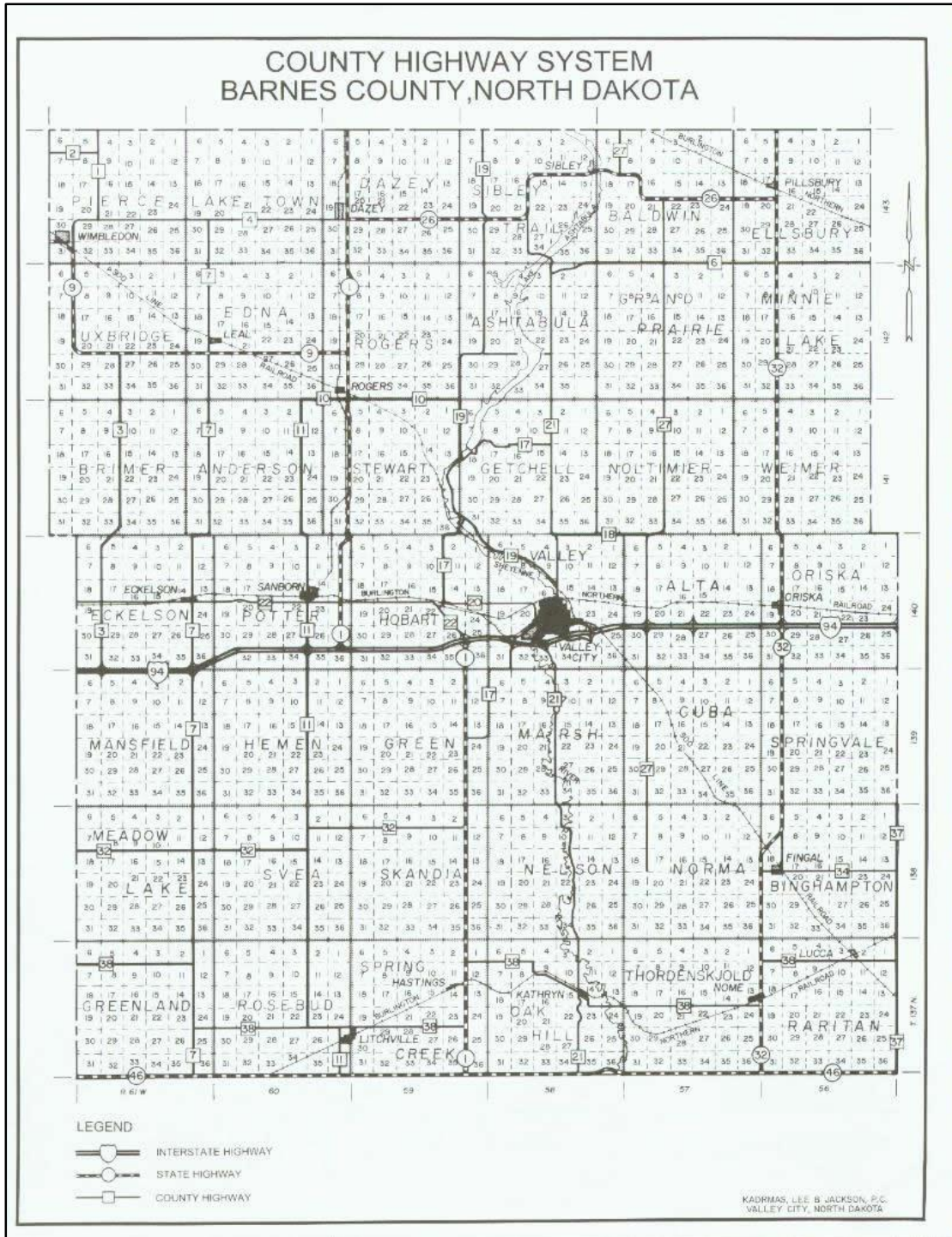
Valley City Shelters:

- Jefferson Elementary School, 1150 Central Ave. N
- Hi-Liner Activity Center, 460 Central Ave. N
- VFW, 138 East Main
- City Auditorium, 320 Central Ave. S.....Capacity of 500
- Valley City Rec. Center, 140 4th St. SW
- Graichen Gym, 155 College St. SW.....Capacity of 550
- Robertson Hall, 201 Viking Drive
- Washington Elementary School, 510 8th Ave. SW
- Epworth United Methodist Church, 680 8th Ave. SW.....Capacity of 150
- WE Osmon Fieldhouse, 730 8th Ave. SW.....Capacity of 2000

Sources: Barnes County Emergency Operations Plan, Barnes County Emergency Management

Figure 9.7 shows the highway system in Barnes County. Information on the highway transportation system is important for understanding the transportation system and potential risk involved with transportation accidents, among other hazards.

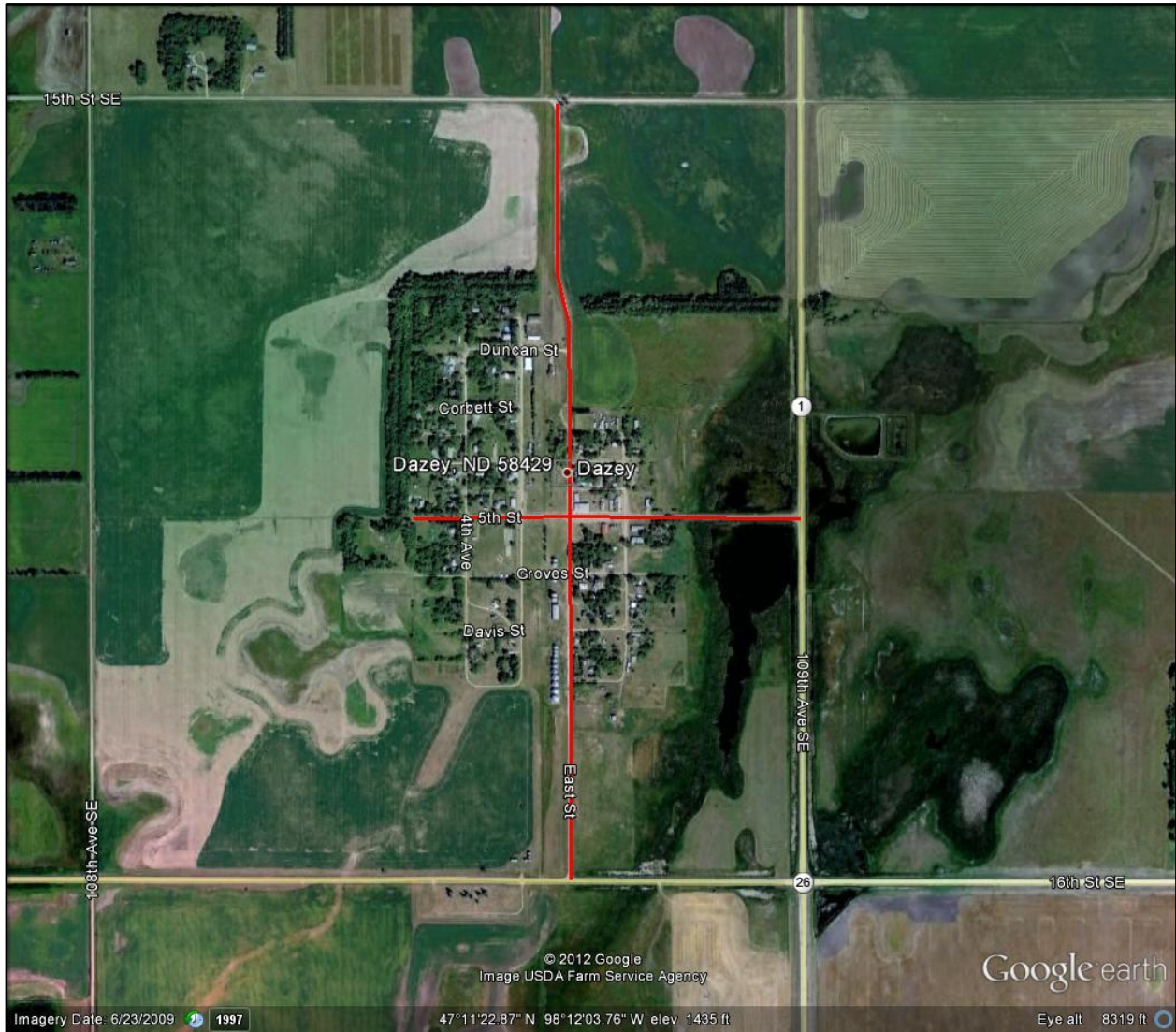
Figure 9.7 – Official Barnes County Highway System



Source: Barnes County Highway Department

Evacuation routes are necessary in mitigation to reduce or eliminate loss of life and injury during hazards. Figures 9.8 to 9.18 show the evacuation routes for incorporated jurisdictions in Barnes County. The extent of each evacuation route is shown in red.

Figure 9.8 – City of Dazey Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.9 – City of Fingal Evacuation Routes



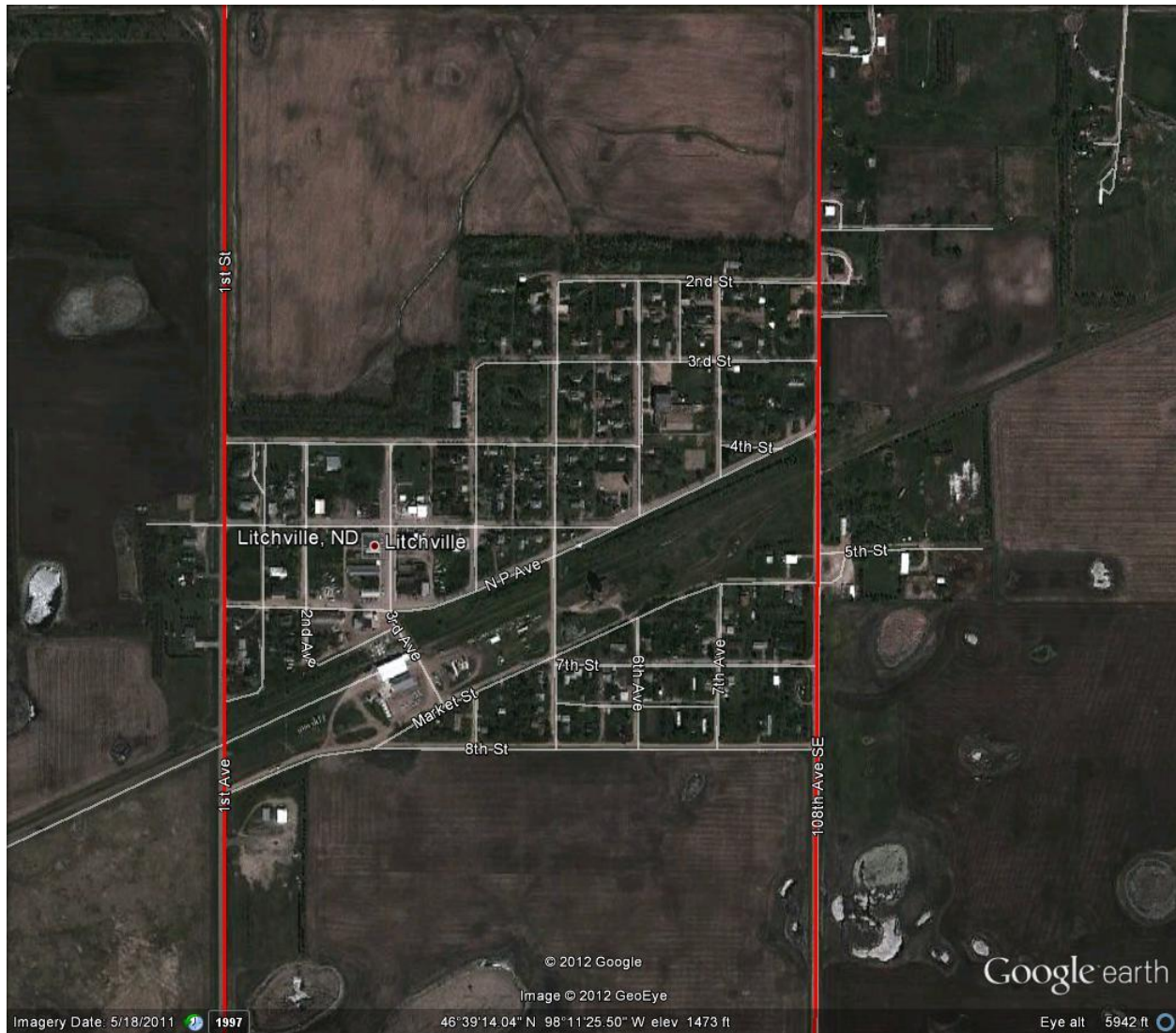
Source: Barnes County Emergency Management

Figure 9.10 – Leal Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.11 – Litchville Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.12 – Nome Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.13 – Oriska Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.14 – Pillsbury Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.15 – Rogers Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.16 – Sanborn Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.17 – Sibley Evacuation Routes



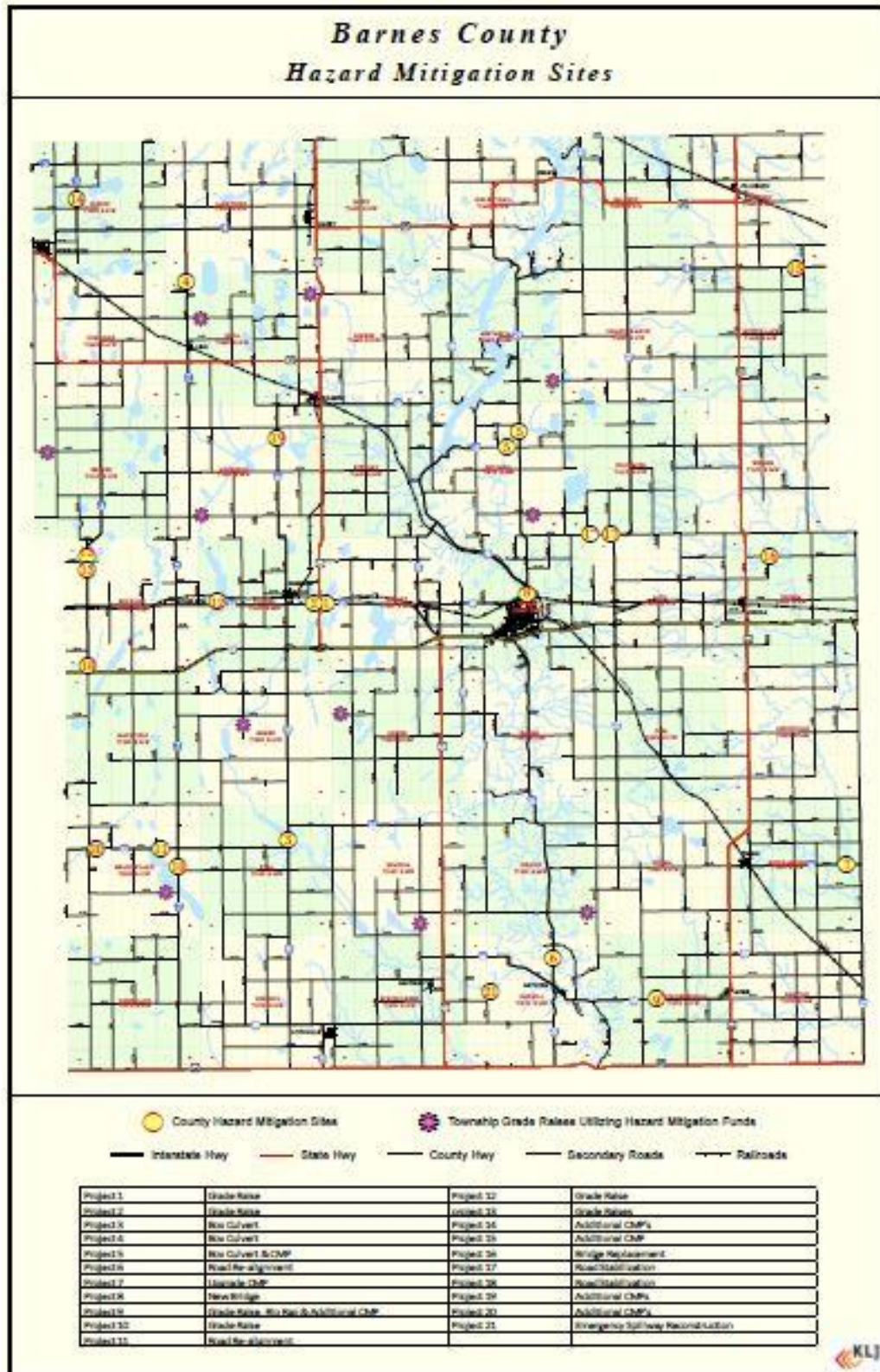
Source: Barnes County Emergency Management

Figure 9.18 – Wimbledon Evacuation Routes



Source: Barnes County Emergency Management

Figure 9.19 – Barnes County Road Hazard Mitigation Sites



Source: Barnes County Highway Department, Kadmas, Lee & Jackson (KLJ)

Figure 9.20 – Barnes County Load Restrictions Map



Source: Barnes County Highway Department, Kadmas, Lee & Jackson (KLJ)

There is one municipal airport in Barnes County are located in Valley City. An aerial map of the airport is shown and was obtained from the North Dakota Aeronautics Commission (NDAC). The NDAC was established in 1947 by the state legislature, assigning responsibility for state aviation functions and serves the public by providing economic and technical assistance for the aviation community.

Figure 9.21 – Barnes County Municipal Airport



Source: North Dakota Aeronautics Commission

Figure 9.22 shows the geographic extent of school districts covering Barnes County. Understanding the boundaries of school districts is important for mitigation to help identify where vulnerable populations are located that would need evacuation assistance in the event of a hazard.

Figure 9.22 – Barnes County School Districts



Source: North Dakota Geographic Information Systems

Barnes County NFIP Maps

FEMA flood maps were produced for Barnes County and impacted jurisdictions in 2008 and are shown in Figures 9.23 to 9.72 on the following pages. Mapping helps determine which areas are flood prone and no suitable for development. New and future development in Barnes County is less vulnerable to flooding than other counties without flood maps as local government can plan future growth accordingly.

Figure 9.23 – Barnes County FEMA Flood Map

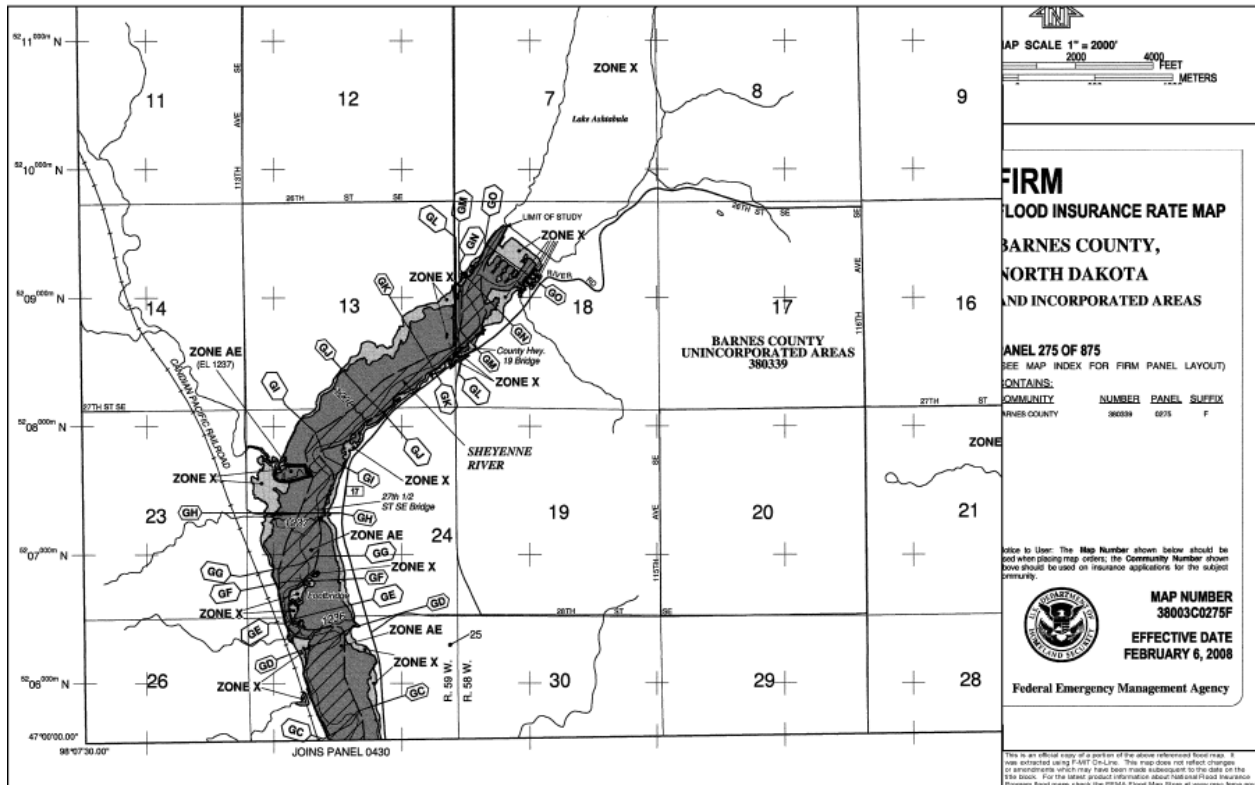


Figure 9.24 – Barnes County FEMA Flood Map

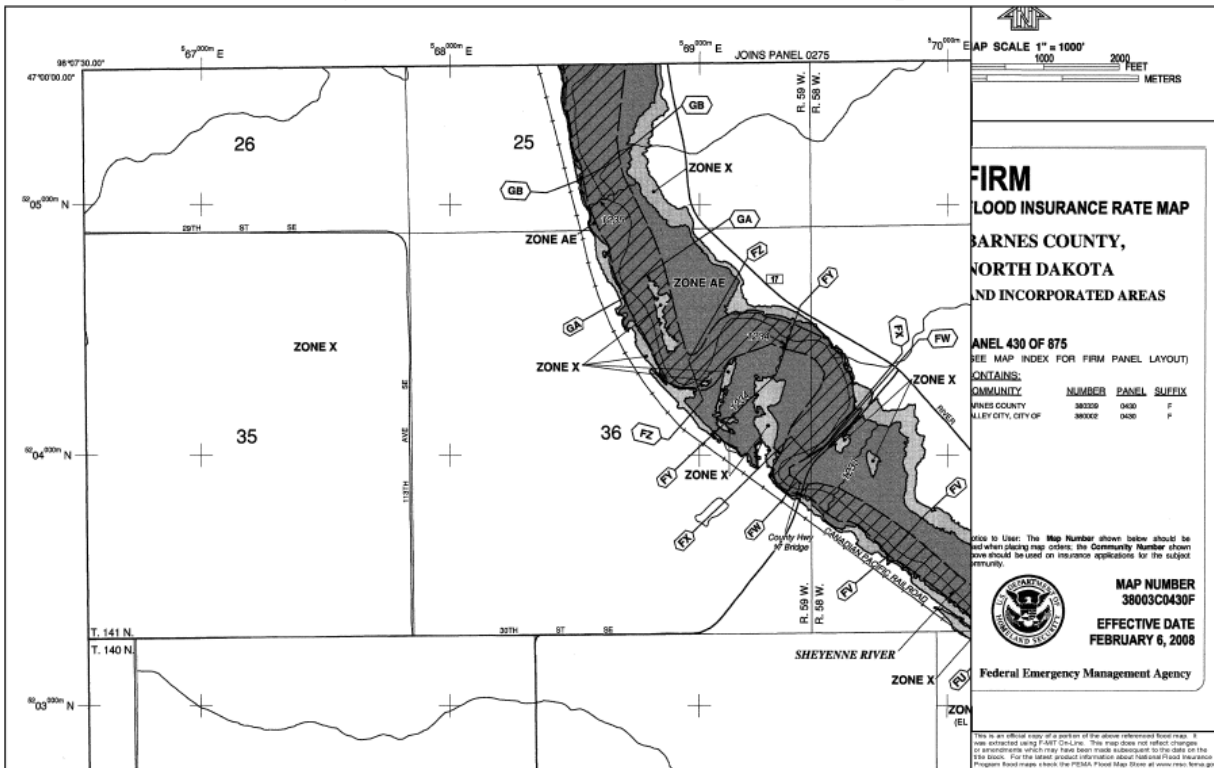


Figure 9.25 – Barnes County FEMA Flood Map

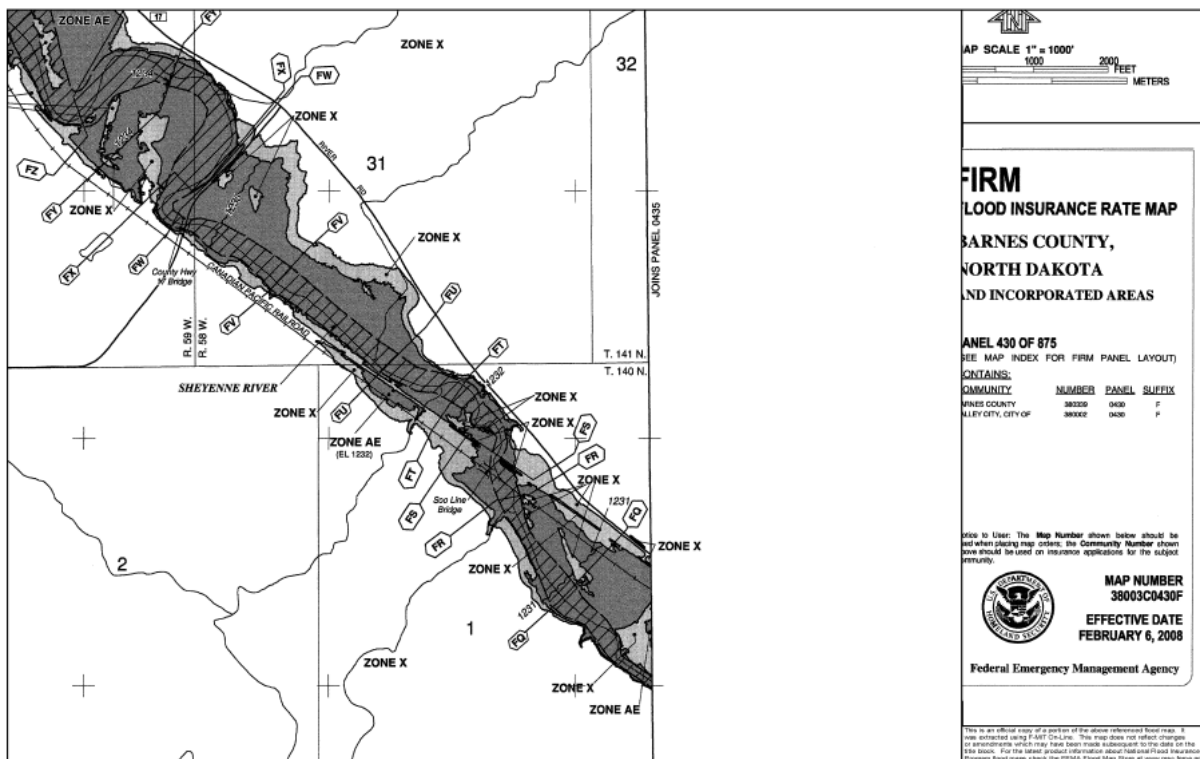


Figure 9.26 – Barnes County FEMA Flood Map

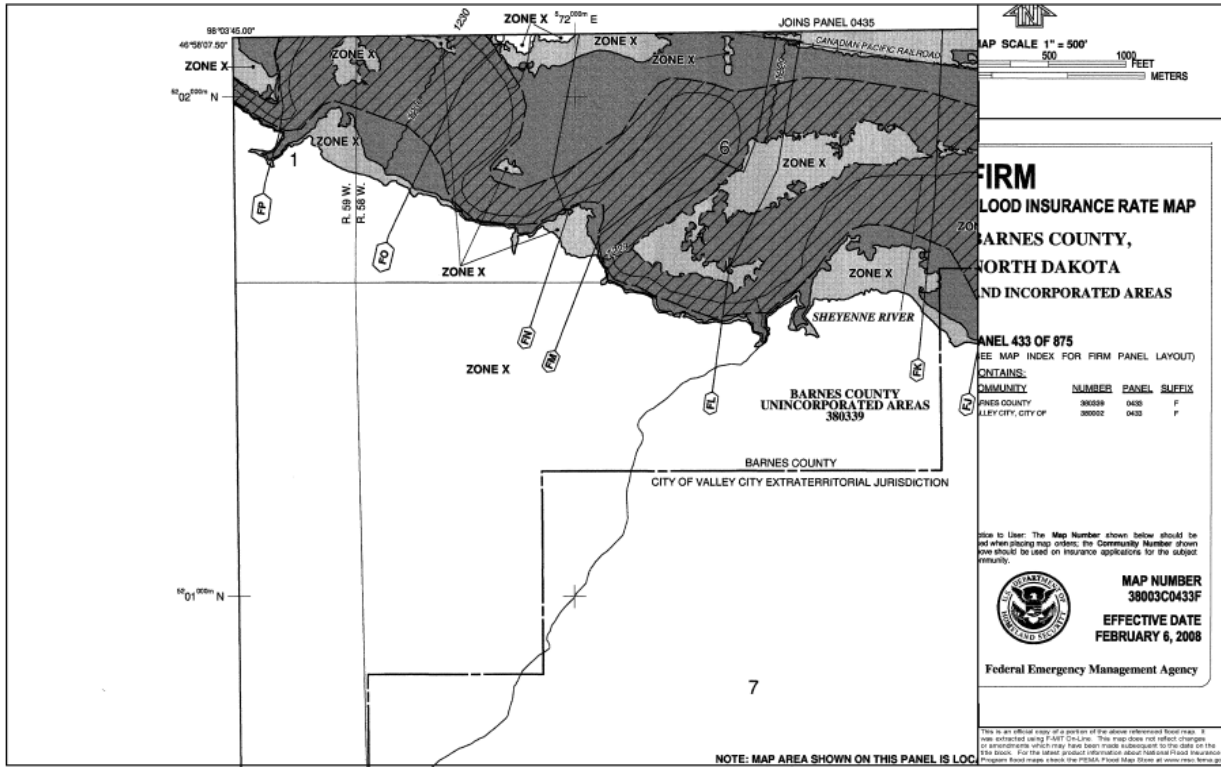


Figure 9.27 – Barnes County FEMA Flood Map

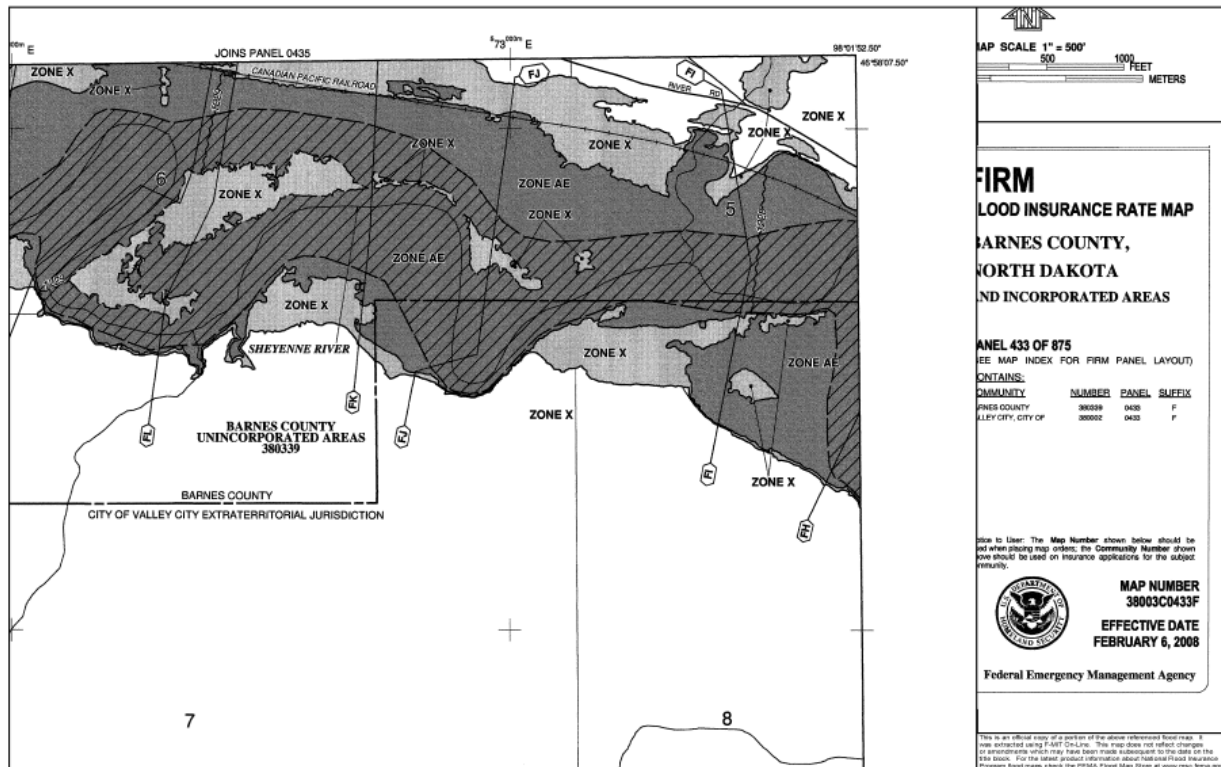


Figure 9.30 – Barnes County FEMA Flood Map

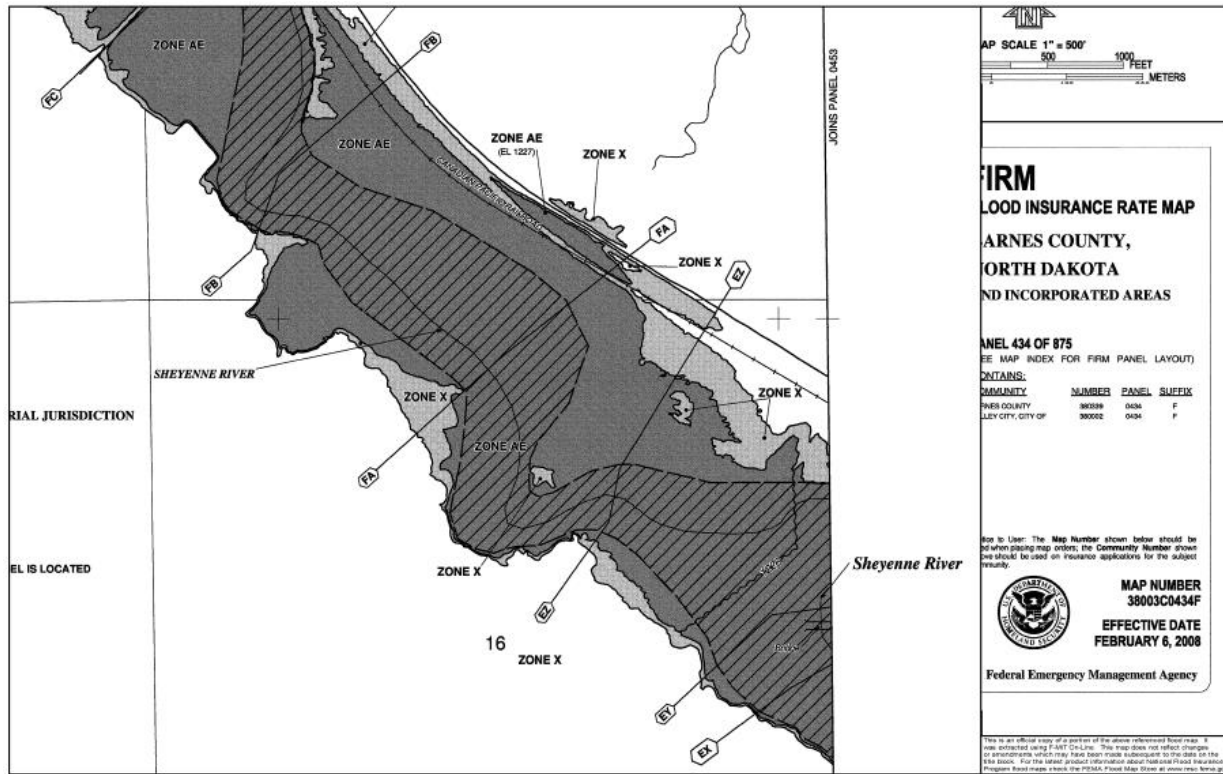


Figure 9.31 – Barnes County FEMA Flood Map

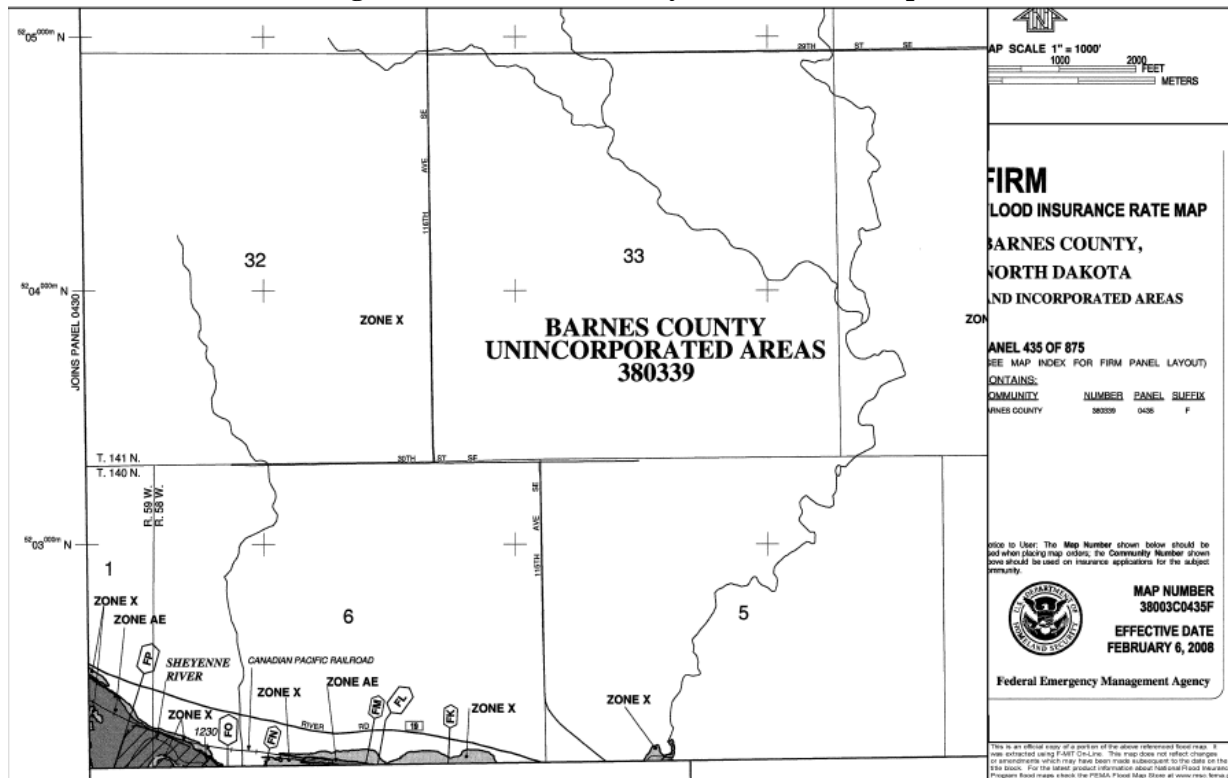


Figure 9.32 – Barnes County FEMA Flood Map

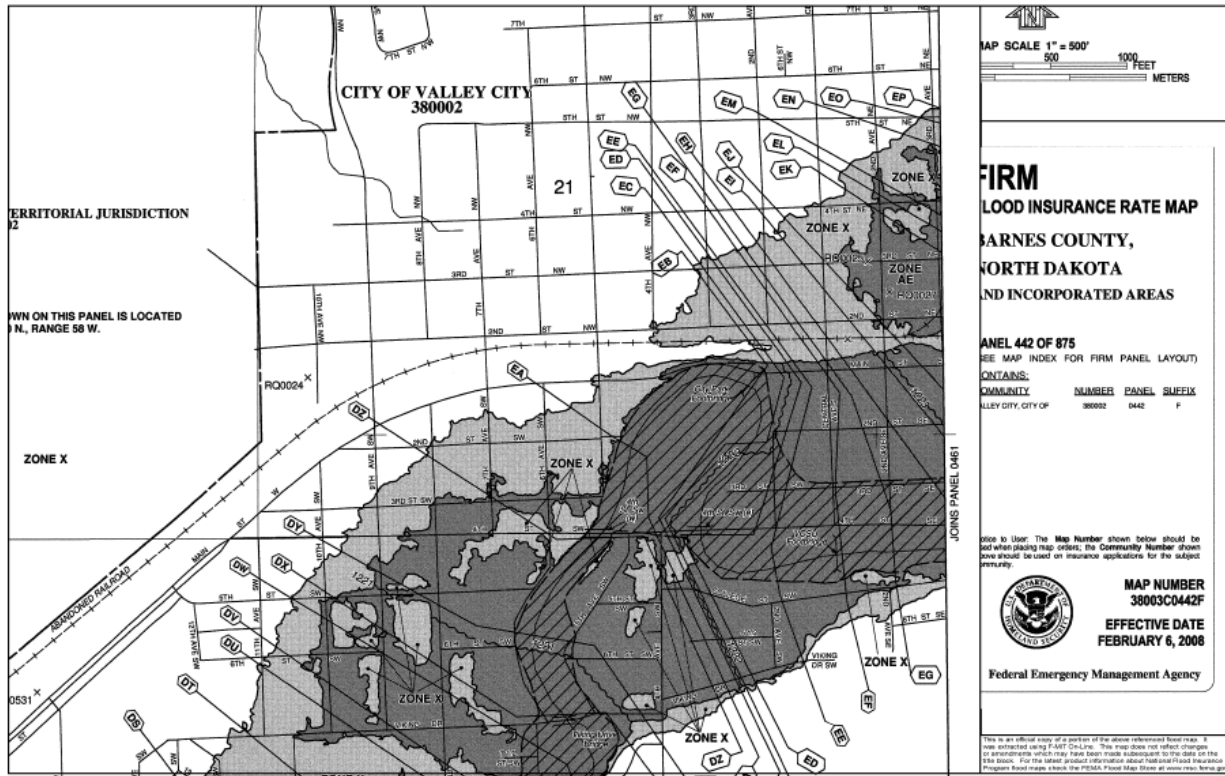


Figure 9.33 – Barnes County FEMA Flood Map

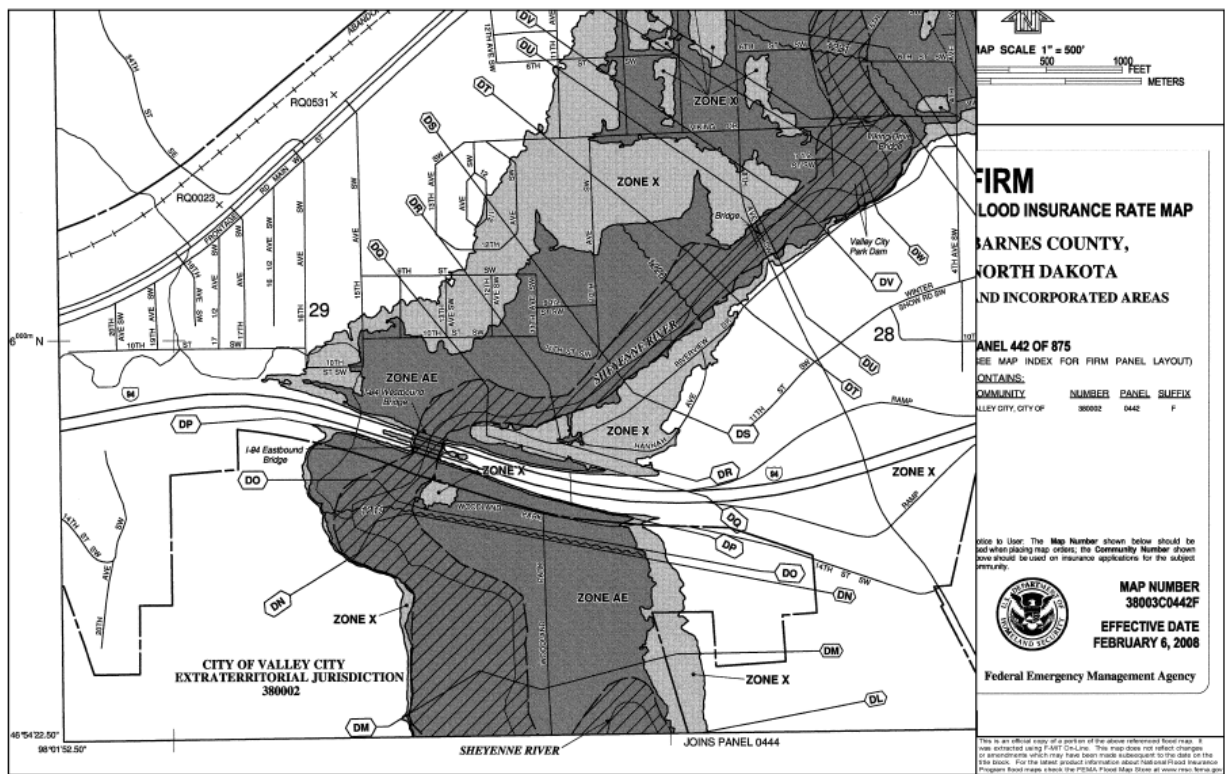


Figure 9.34 – Barnes County FEMA Flood Map

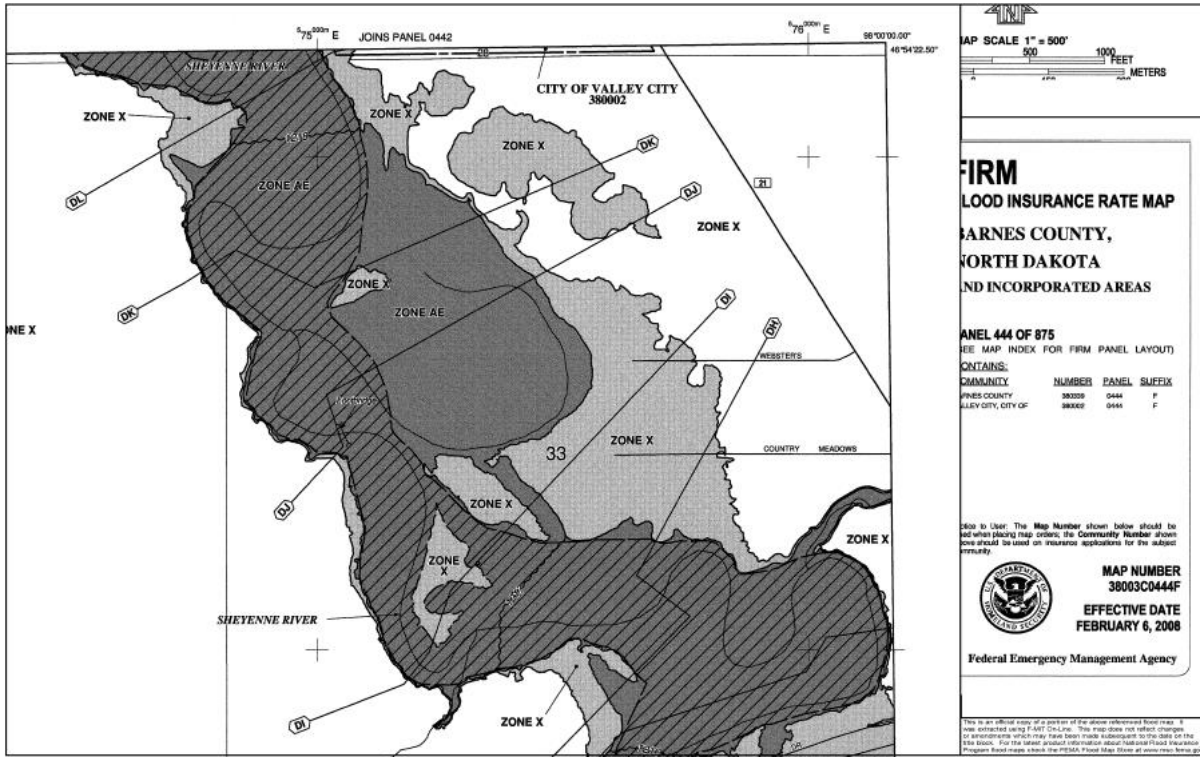


Figure 9.35 – Barnes County FEMA Flood Map

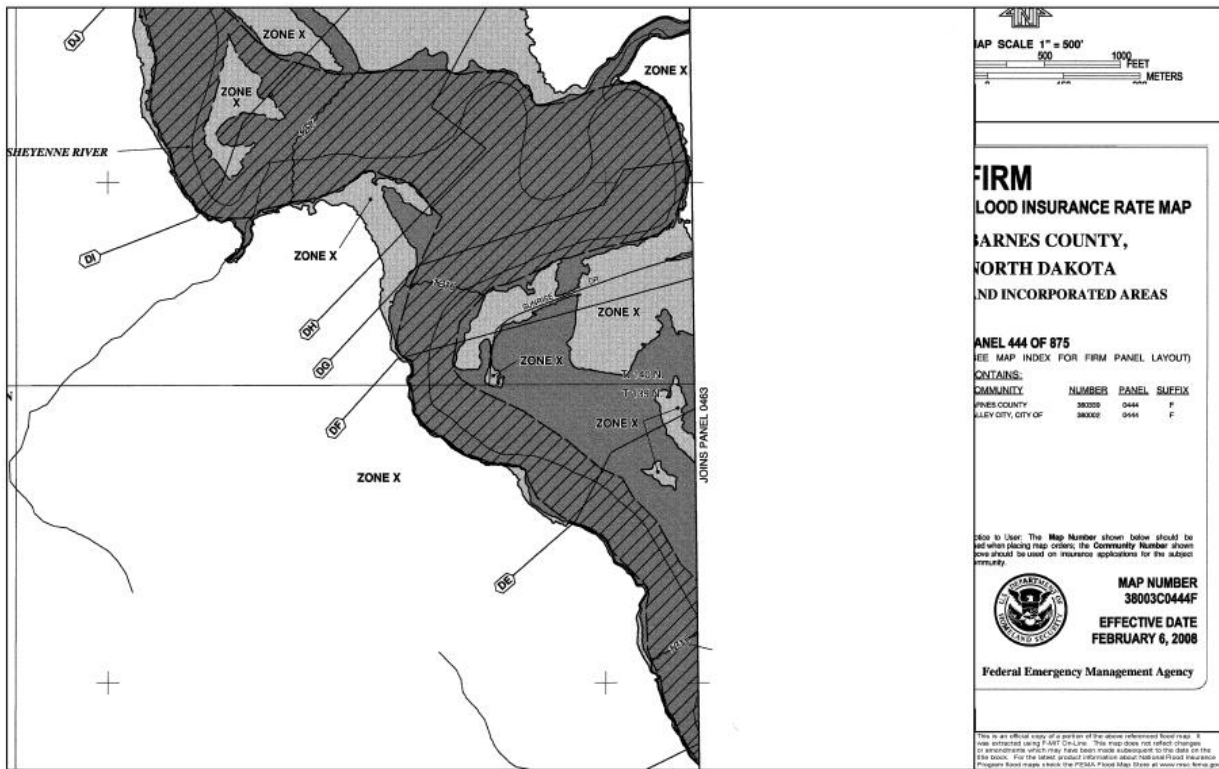


Figure 9.36 – Barnes County FEMA Flood Map

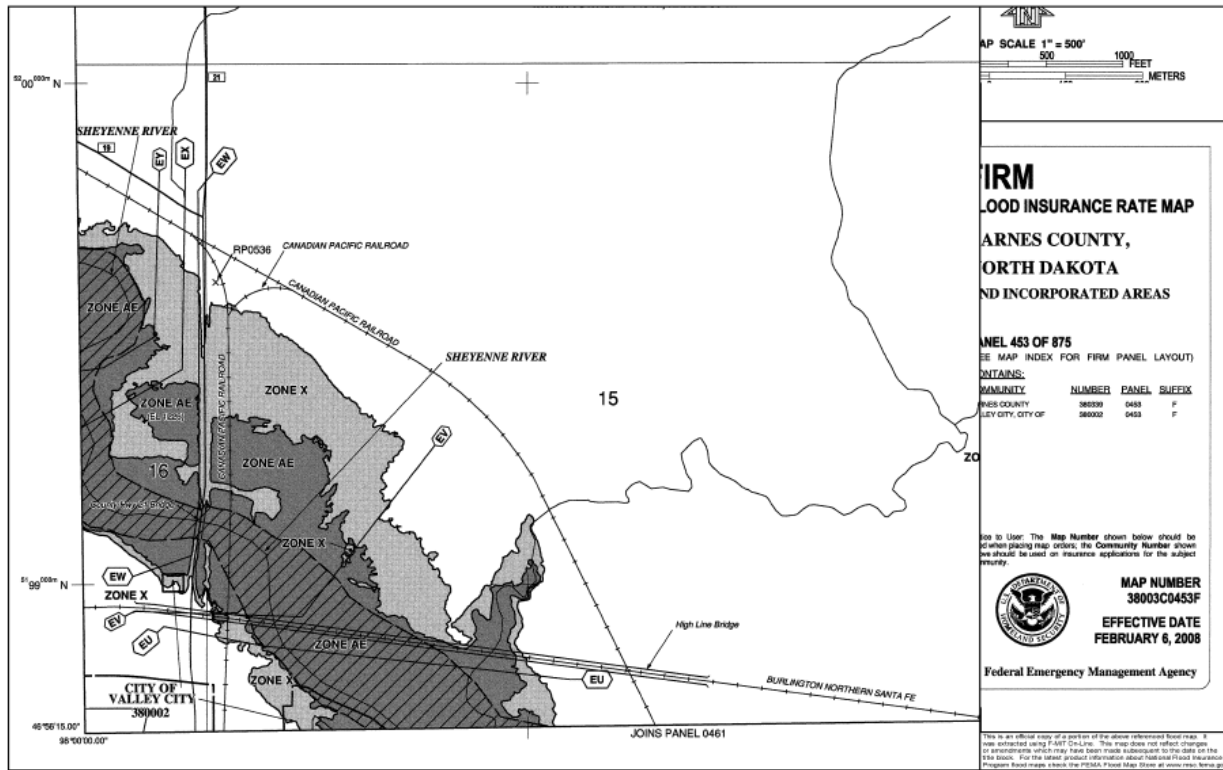


Figure 9.37 – Barnes County FEMA Flood Map

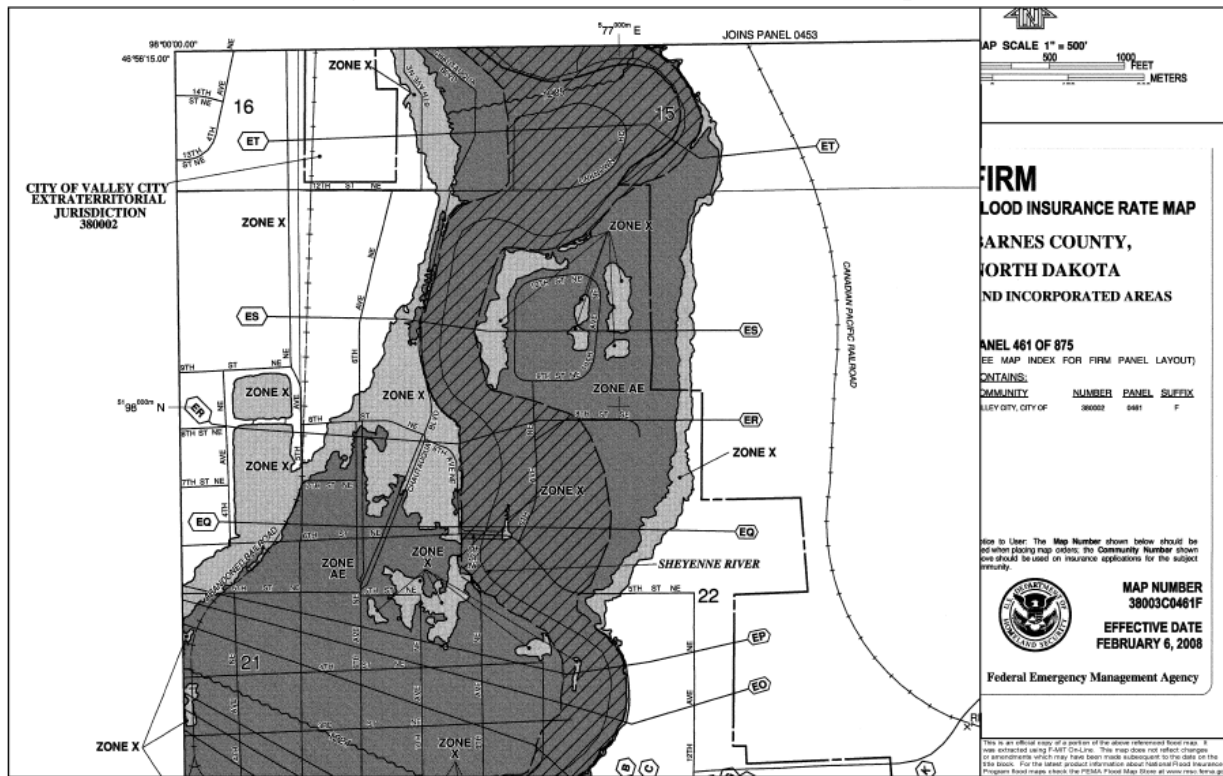


Figure 9.38 – Barnes County FEMA Flood Map

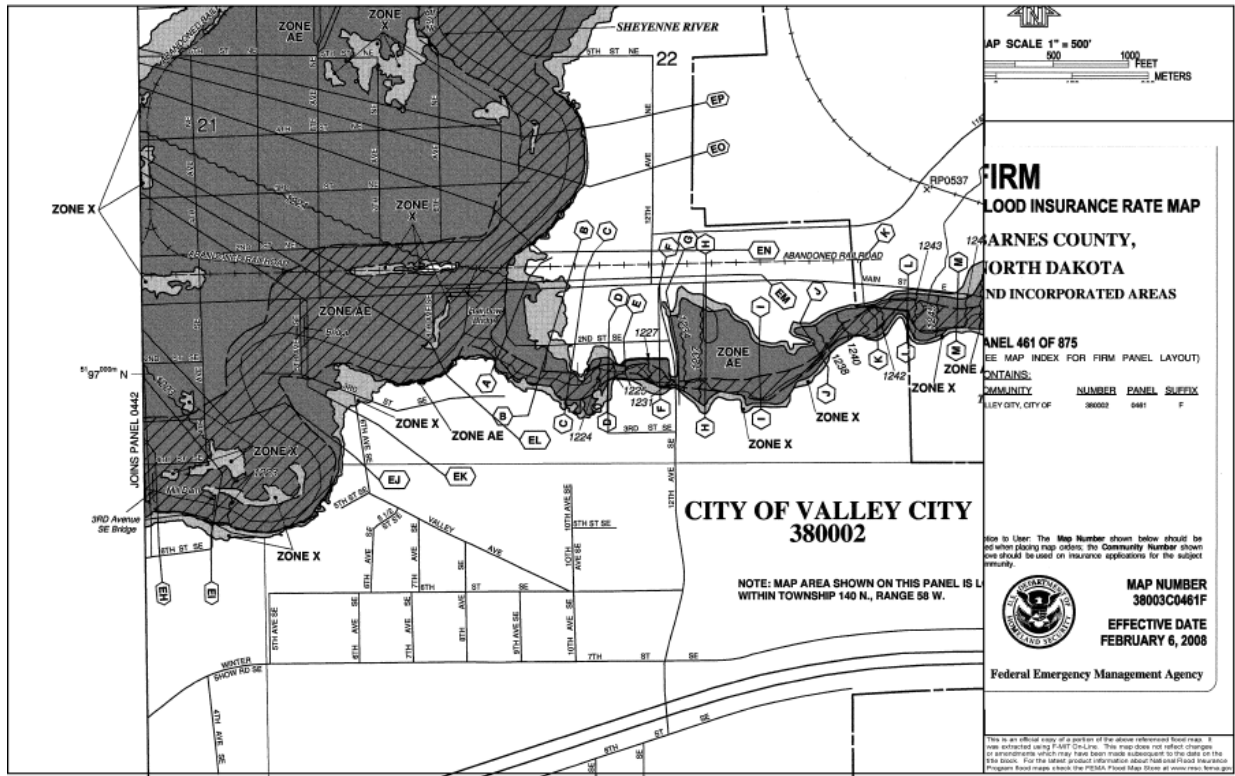


Figure 9.39 – Barnes County FEMA Flood Map

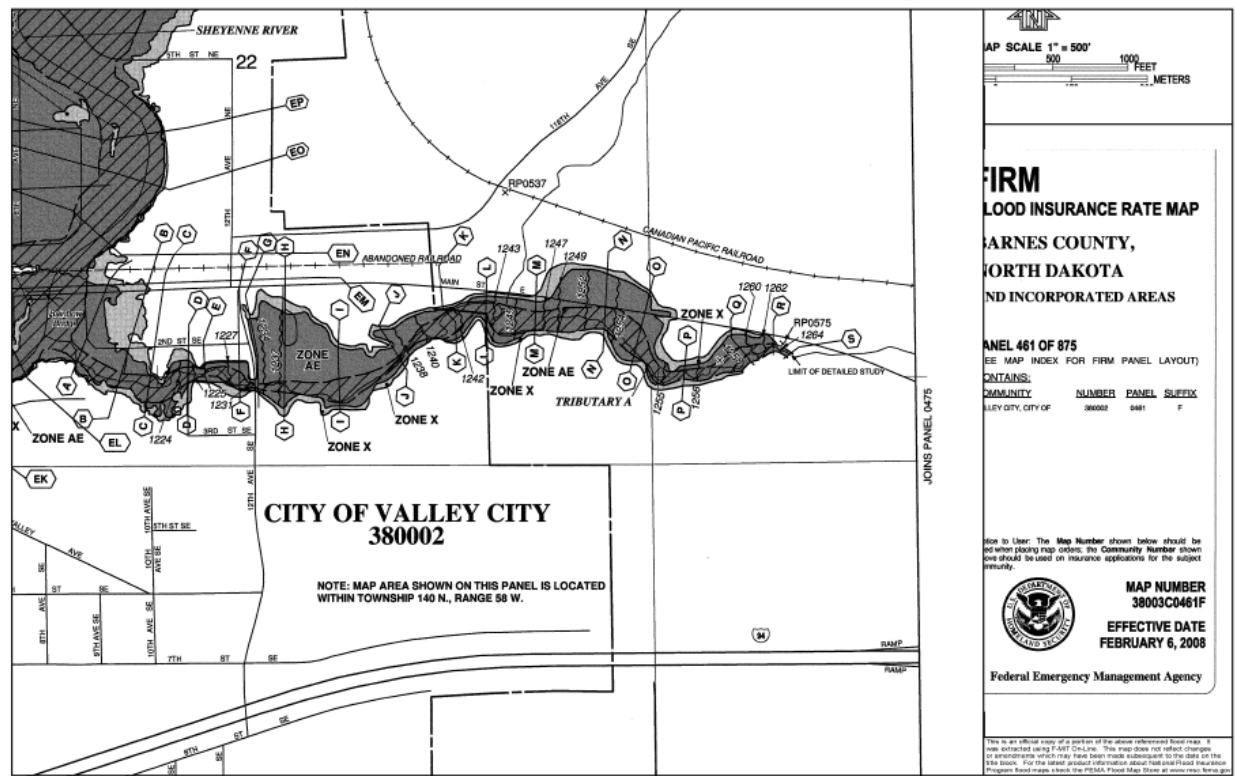


Figure 9.40 – Barnes County FEMA Flood Map

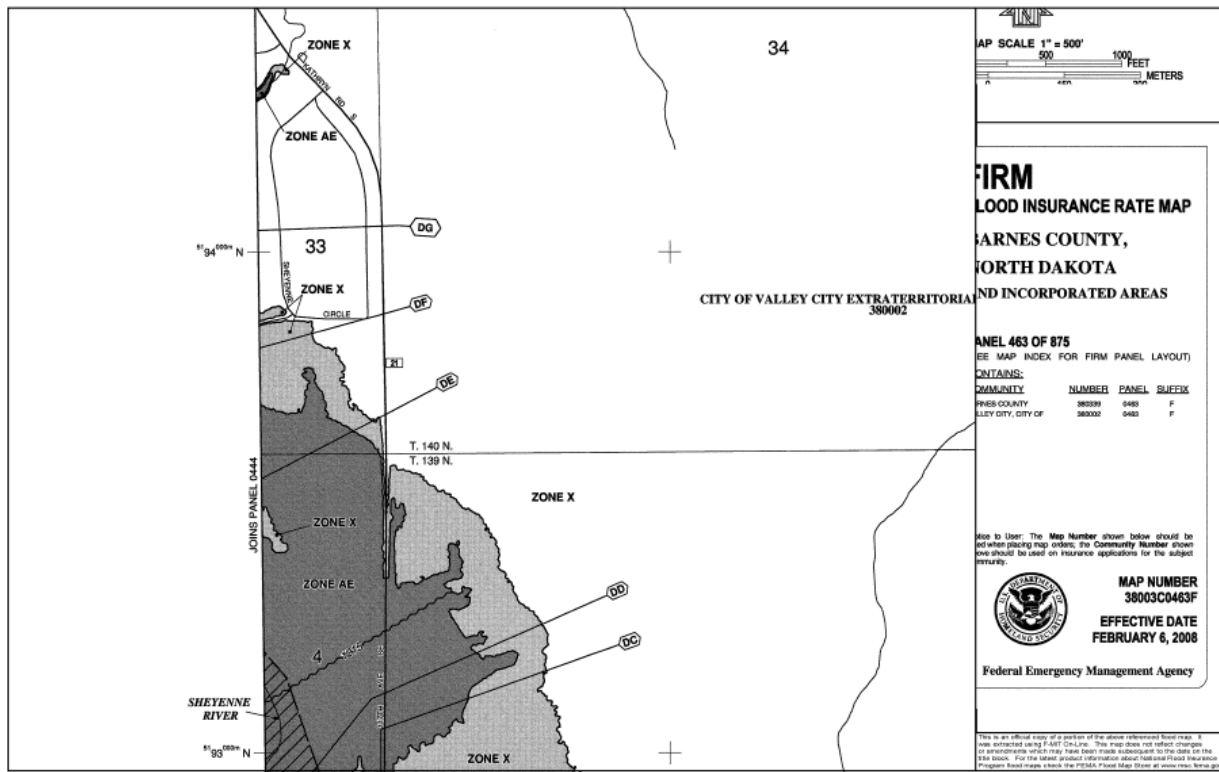


Figure 9.41 – Barnes County FEMA Flood Map

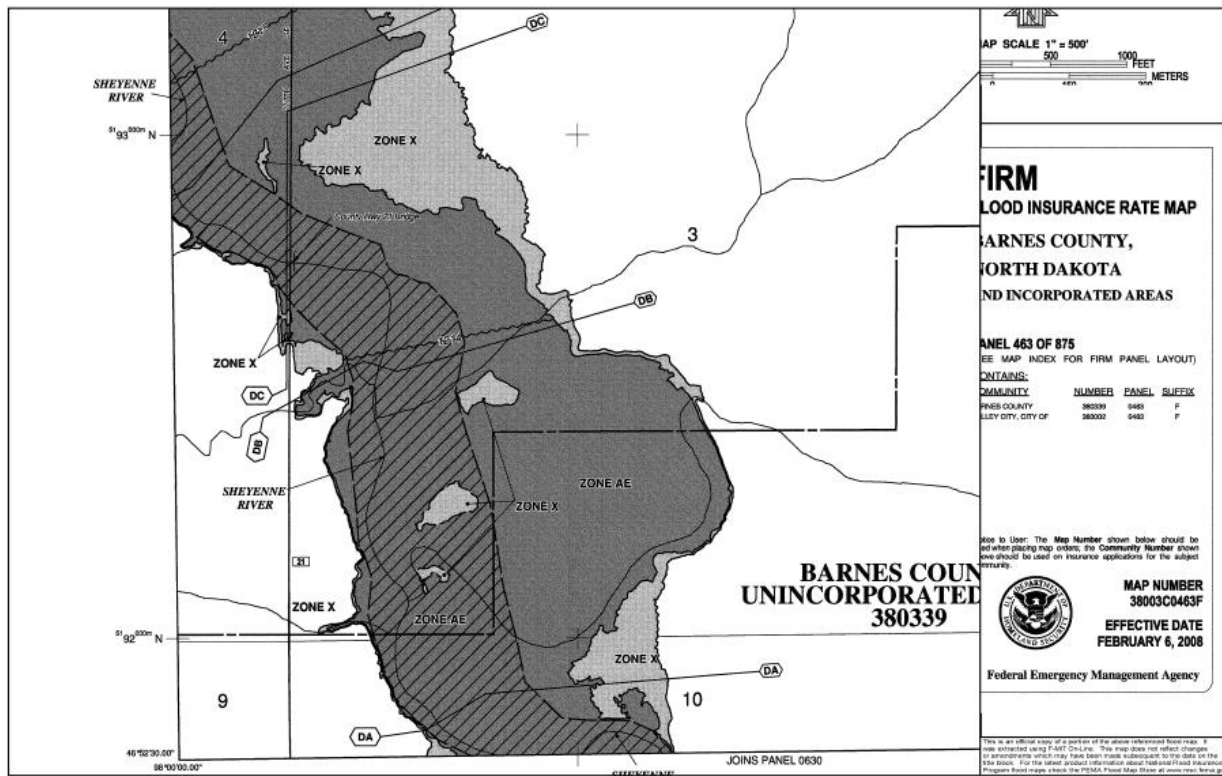


Figure 9.42 – Barnes County FEMA Flood Map

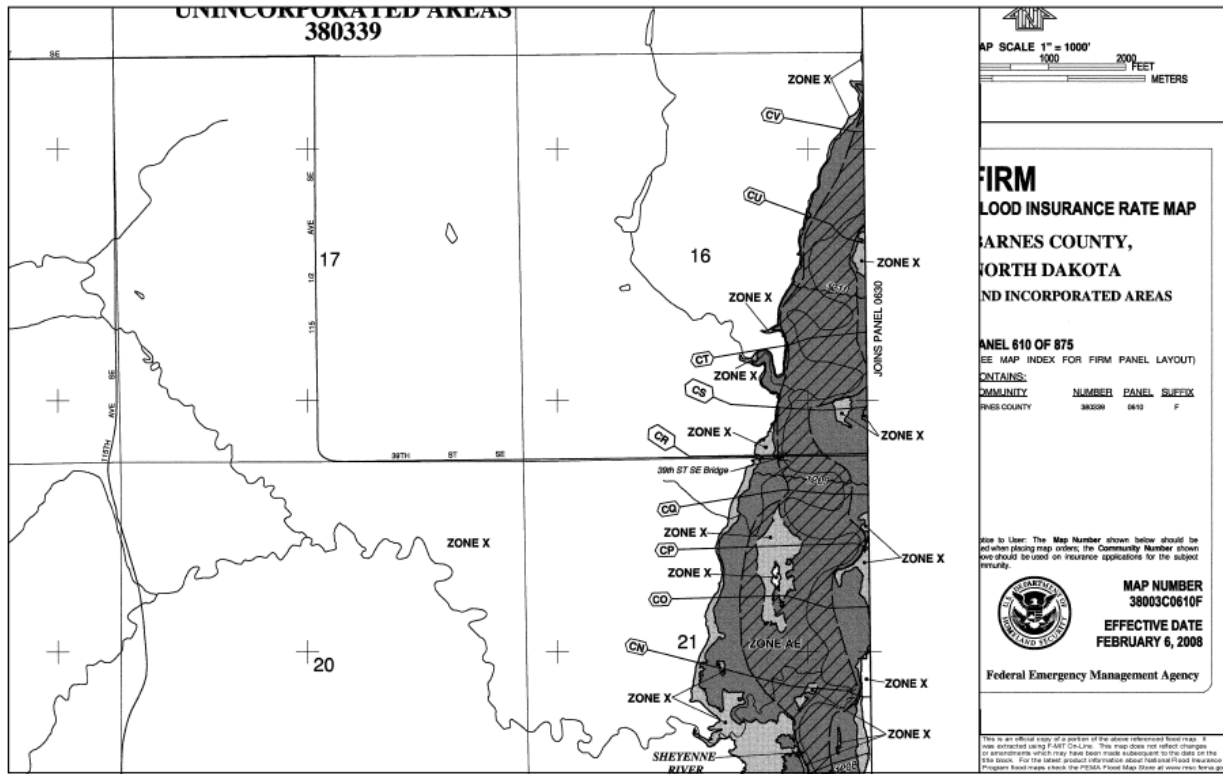


Figure 9.44 – Barnes County FEMA Flood Map

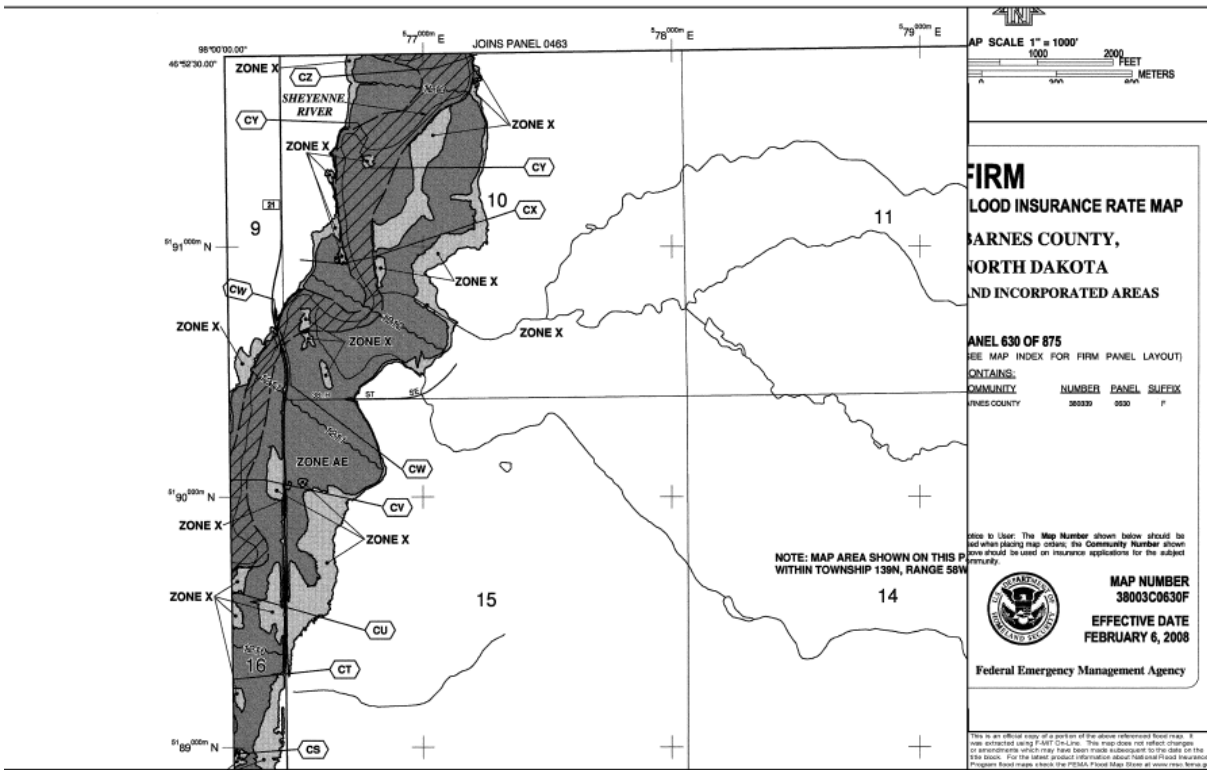


Figure 9.45 – Barnes County FEMA Flood Map

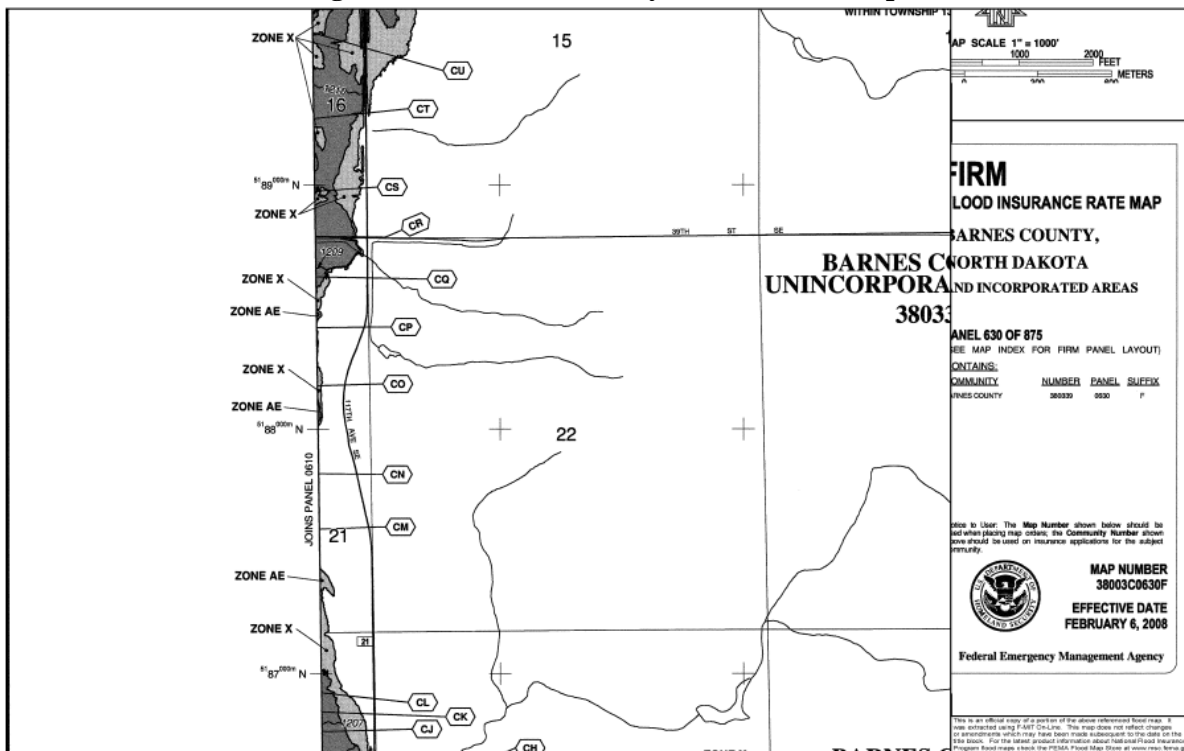


Figure 9.46 – Barnes County FEMA Flood Map

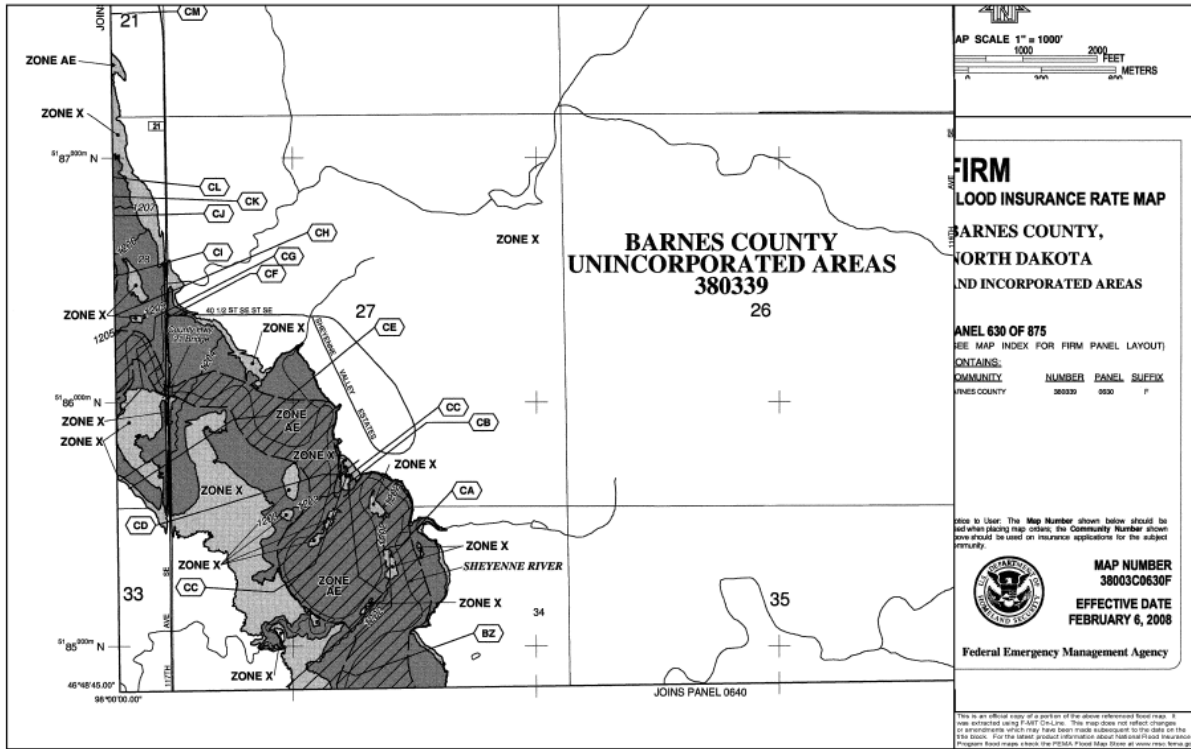


Figure 9.47 – Barnes County FEMA Flood Map

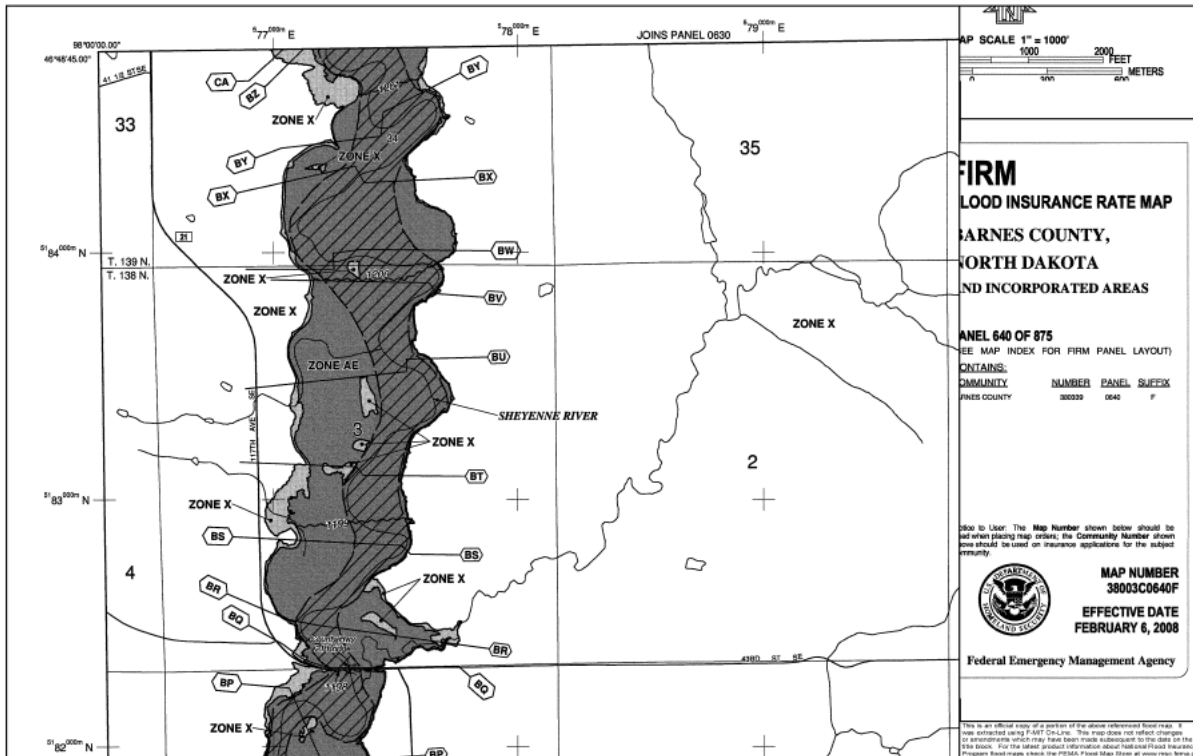


Figure 9.48 – Barnes County FEMA Flood Map

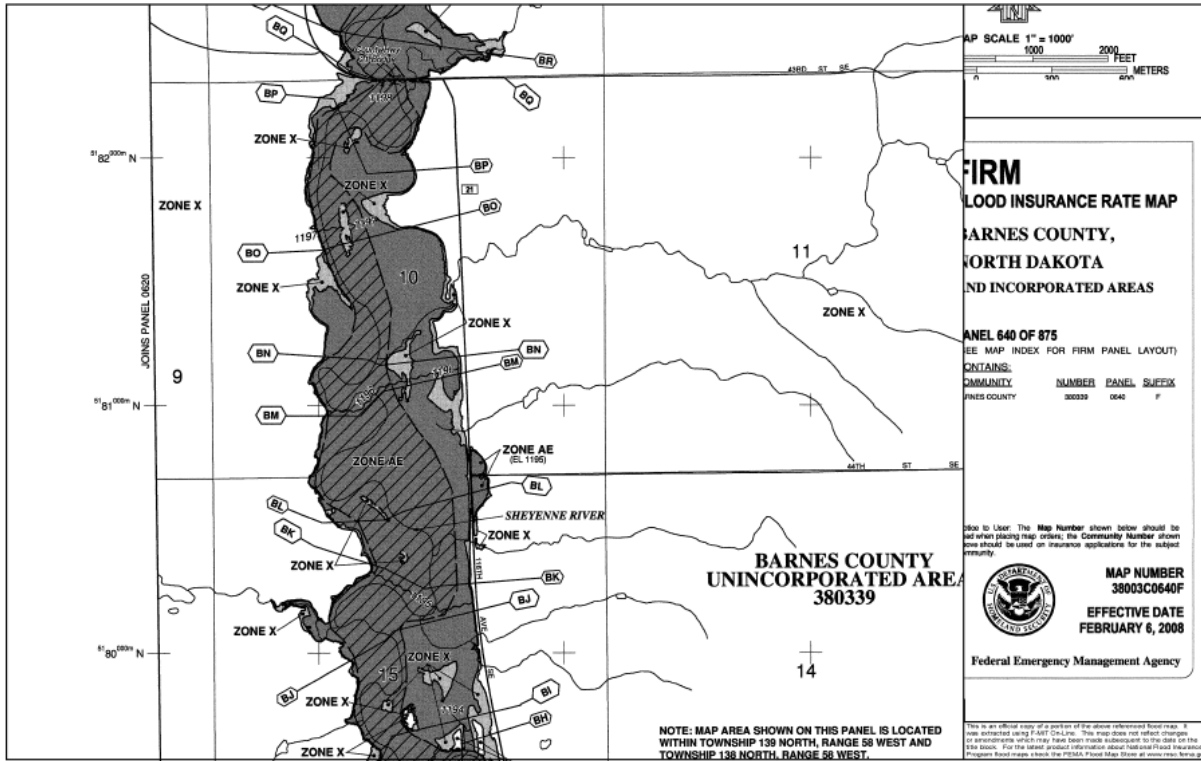


Figure 9.49 – Barnes County FEMA Flood Map

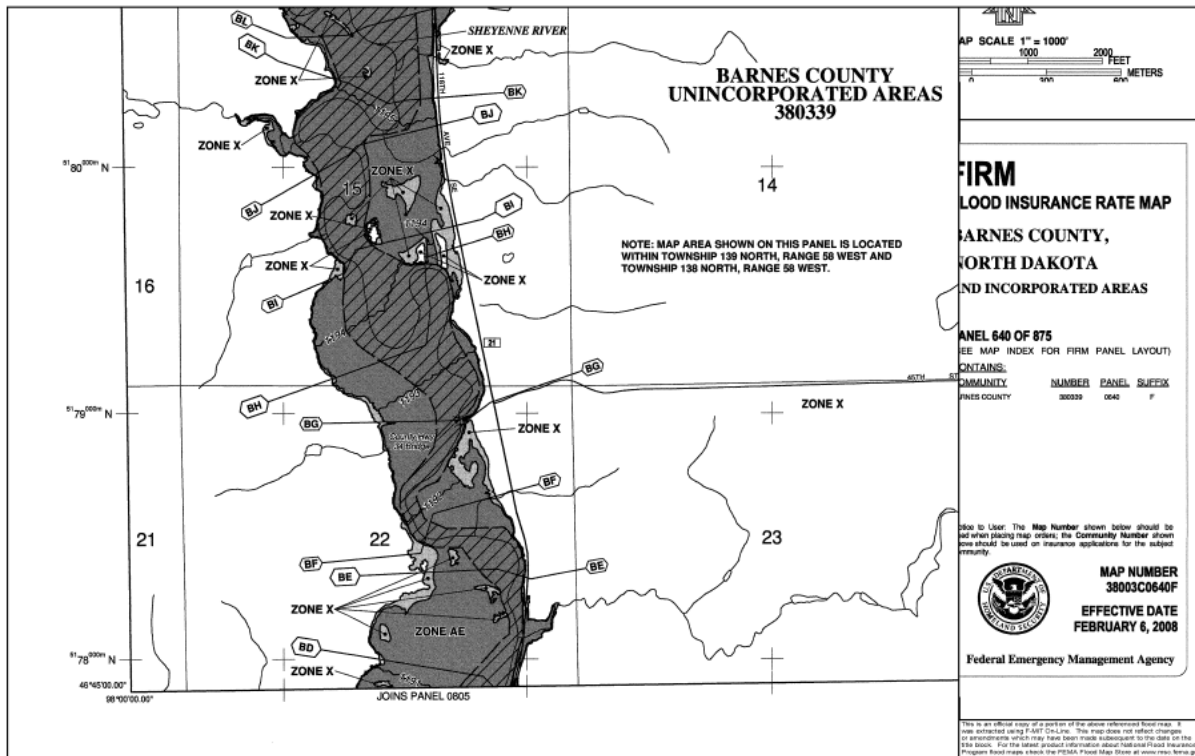


Figure 9.50 – Barnes County FEMA Flood Map

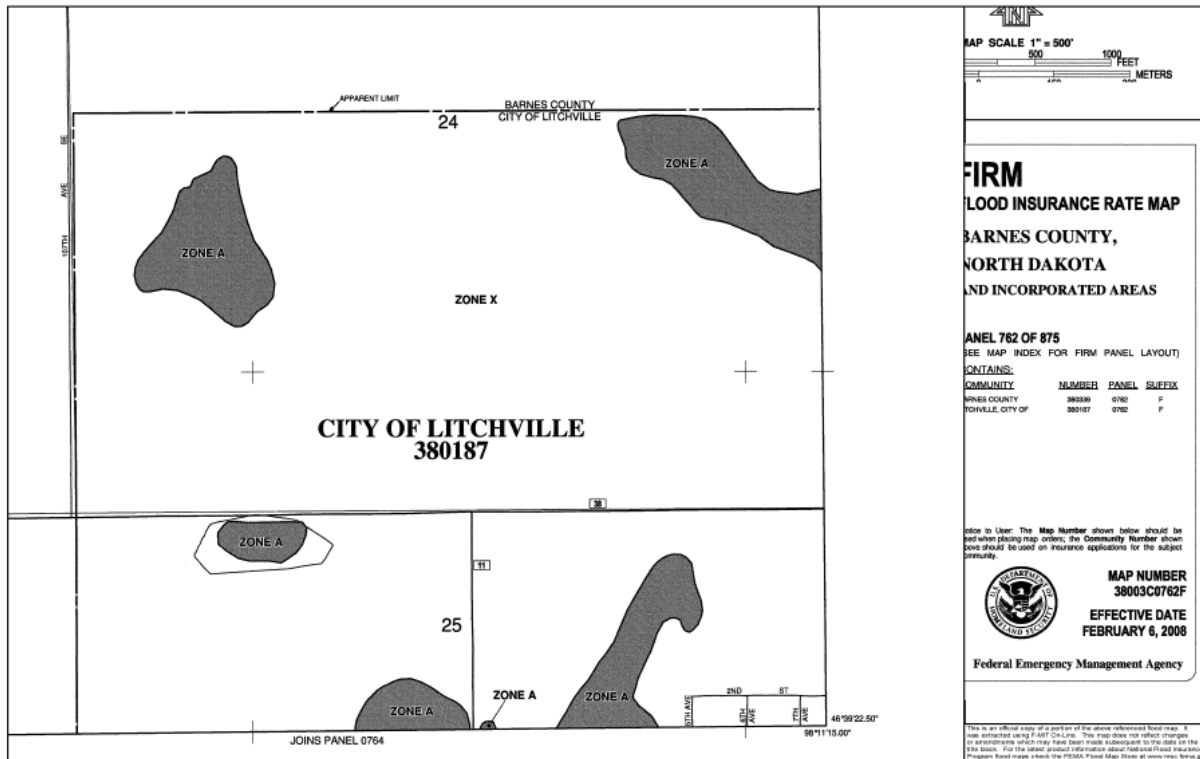


Figure 9.51 – Barnes County FEMA Flood Map

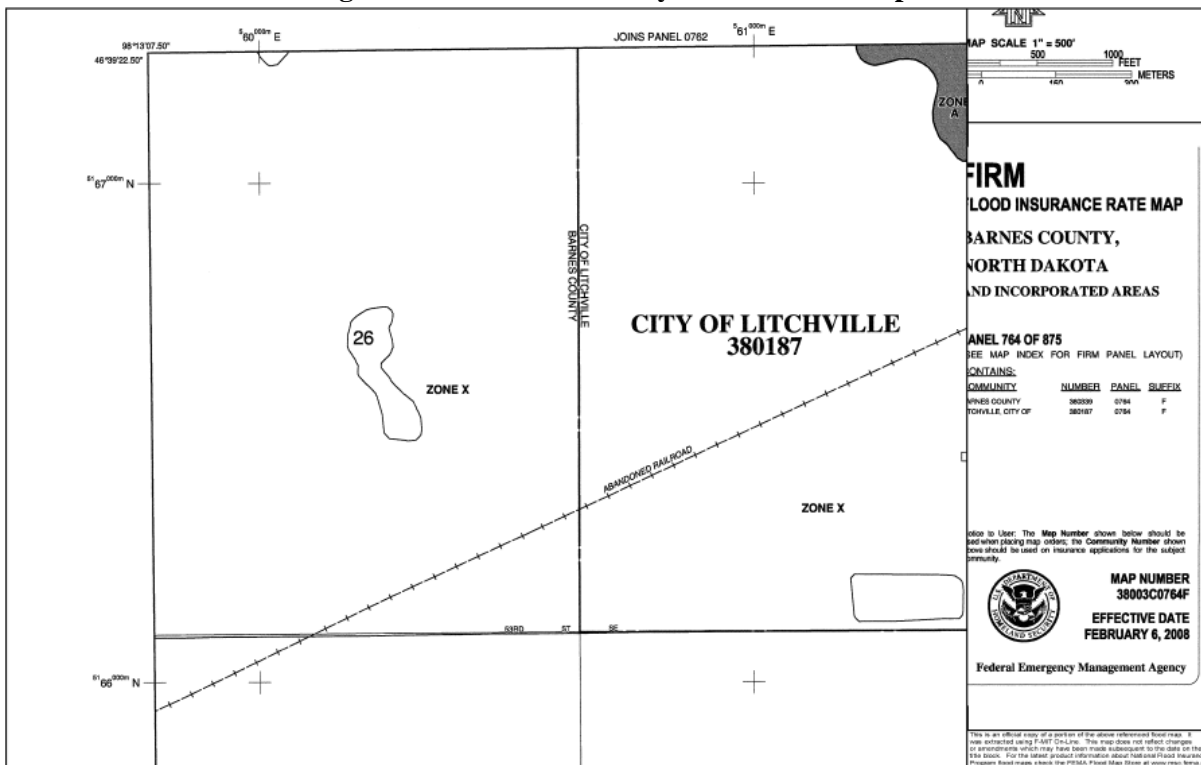


Figure 9.52 – Barnes County FEMA Flood Map

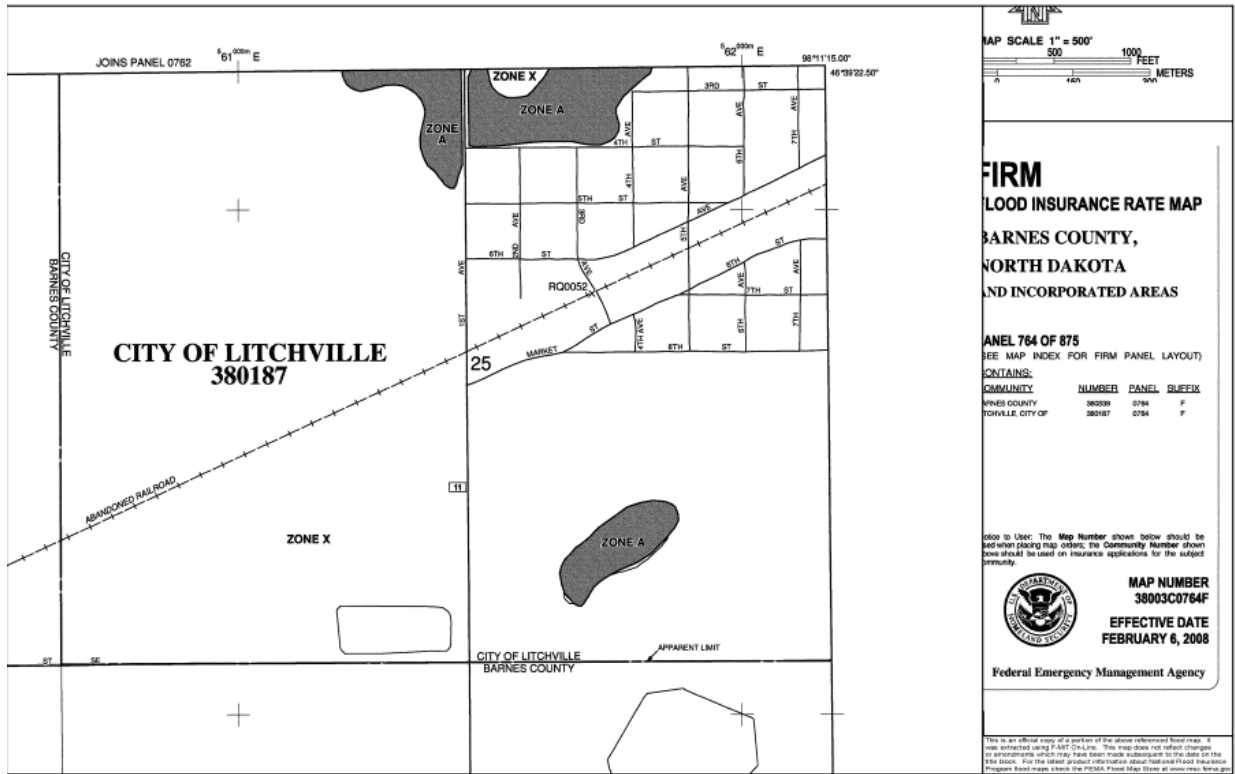


Figure 9.53 – Barnes County FEMA Flood Map

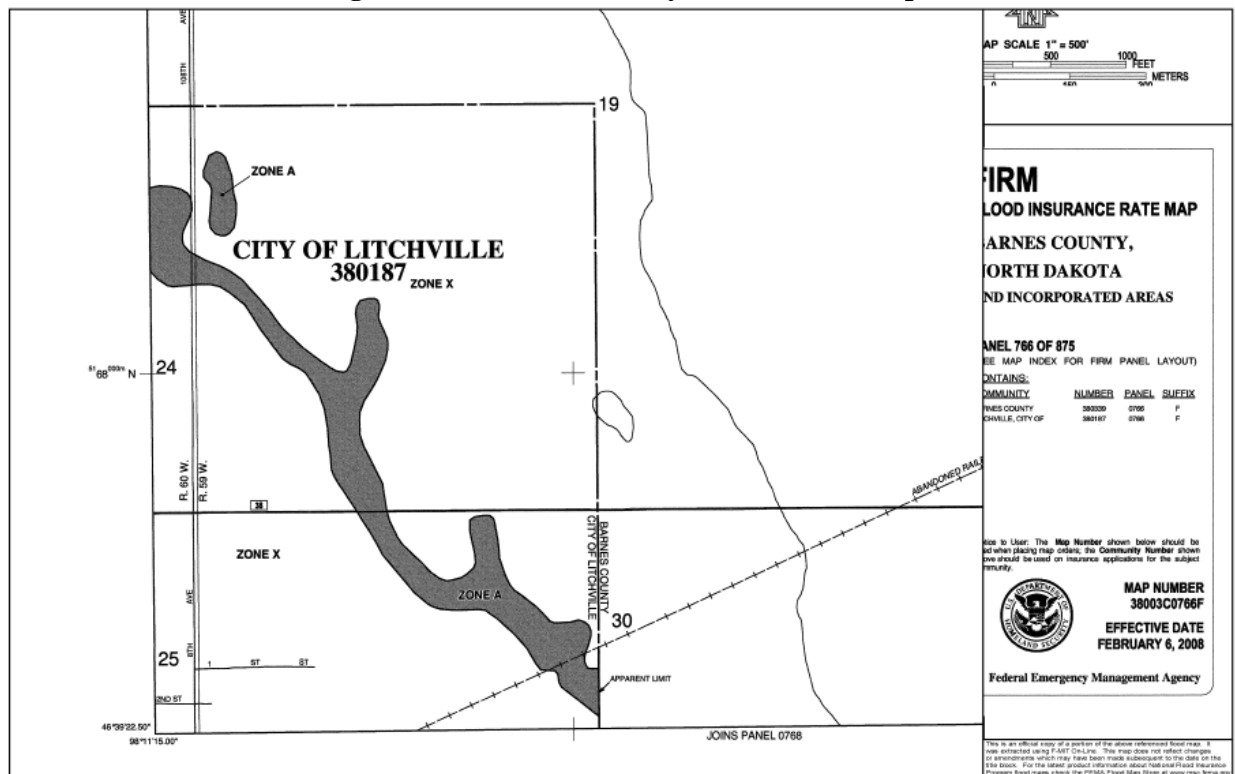


Figure 9.54 – Barnes County FEMA Flood Map

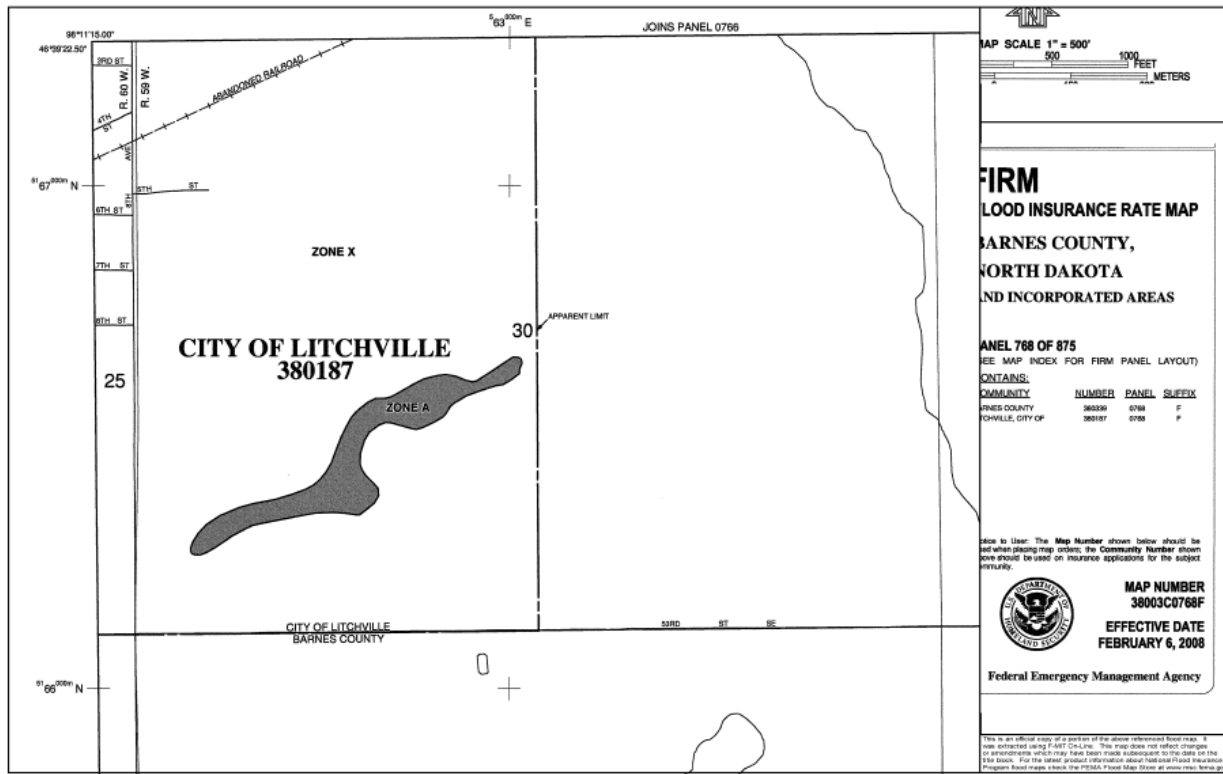


Figure 9.55 – Barnes County FEMA Flood Map

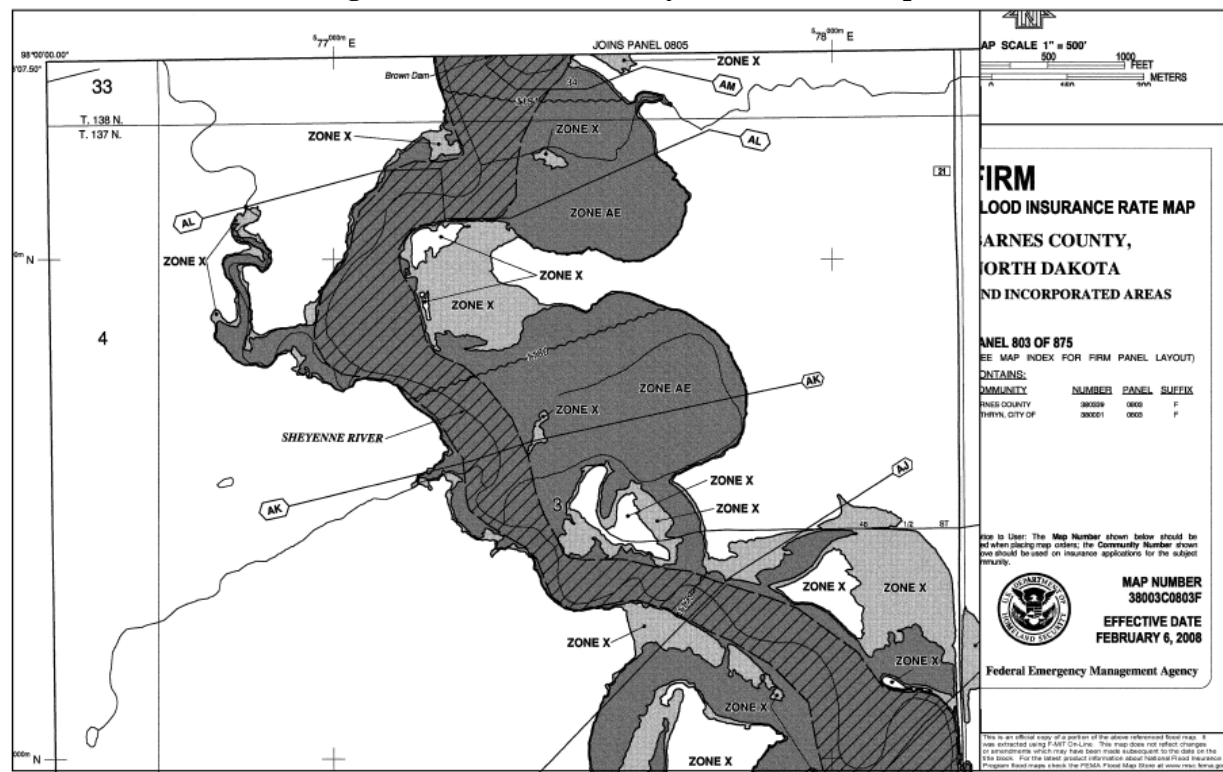


Figure 9.56 – Barnes County FEMA Flood Map

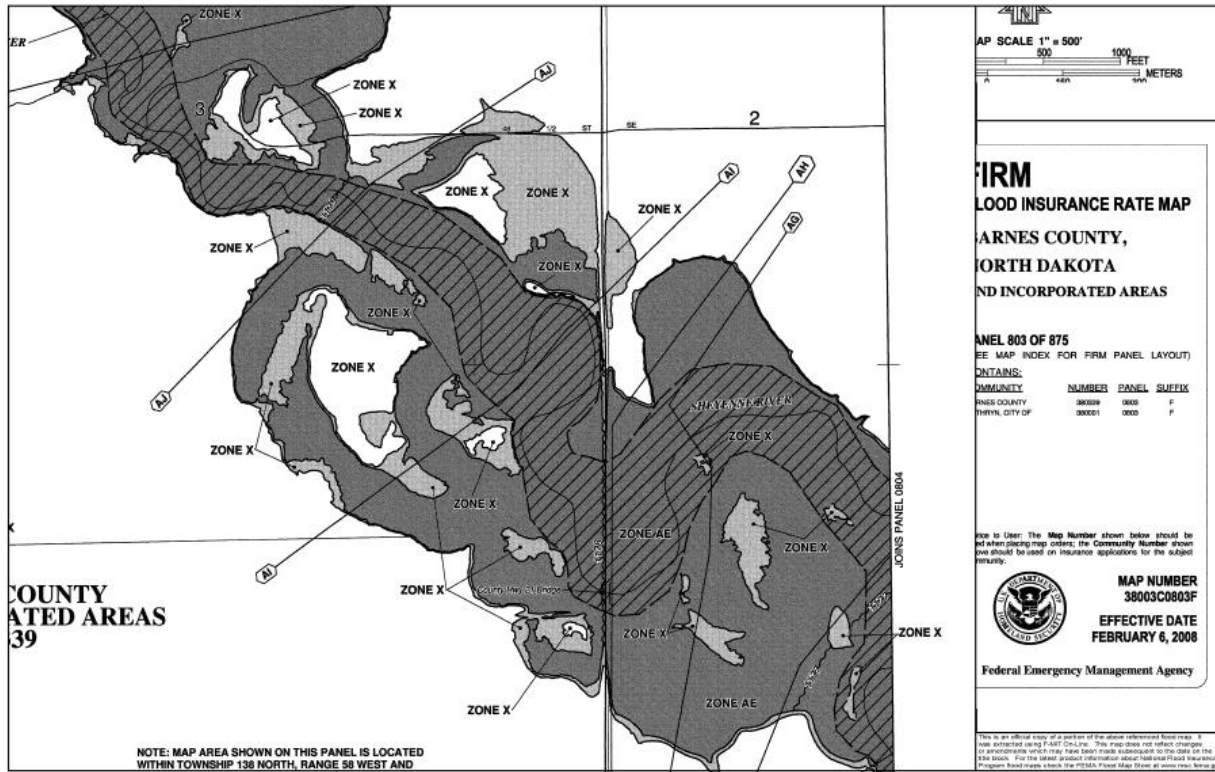


Figure 9.57 – Barnes County FEMA Flood Map

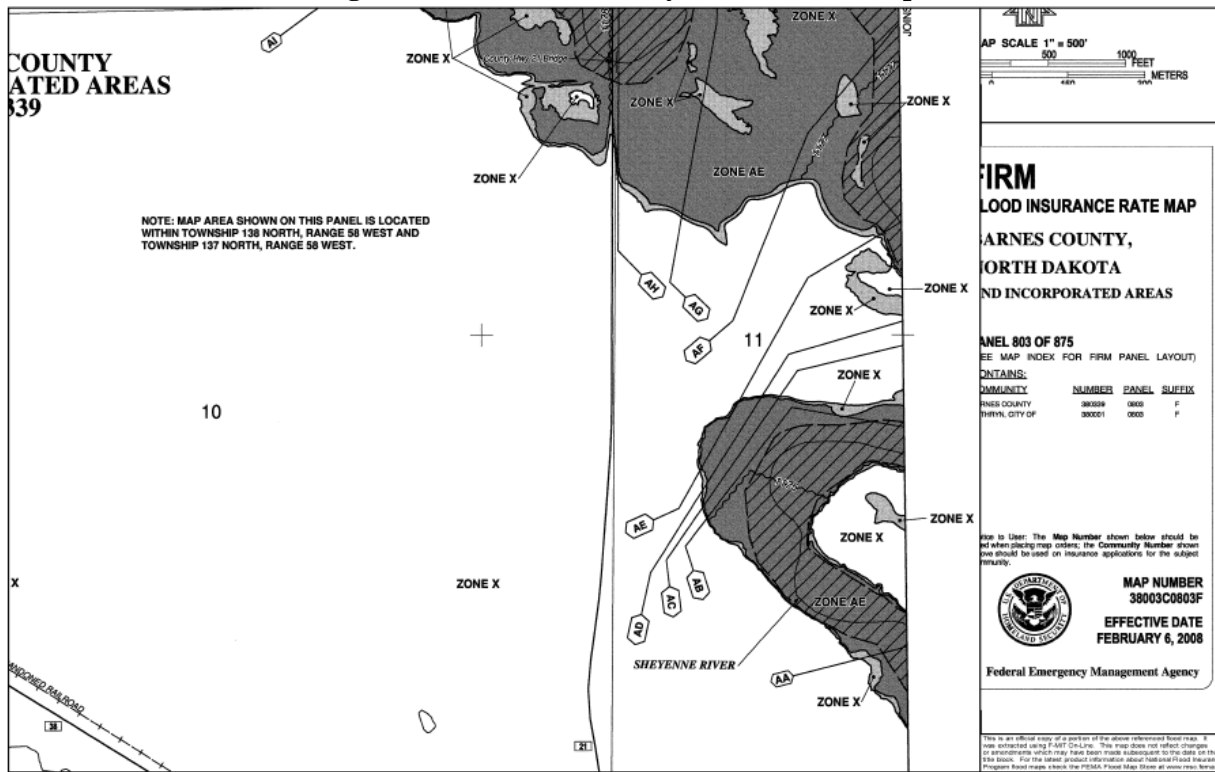


Figure 9.58 – Barnes County FEMA Flood Map

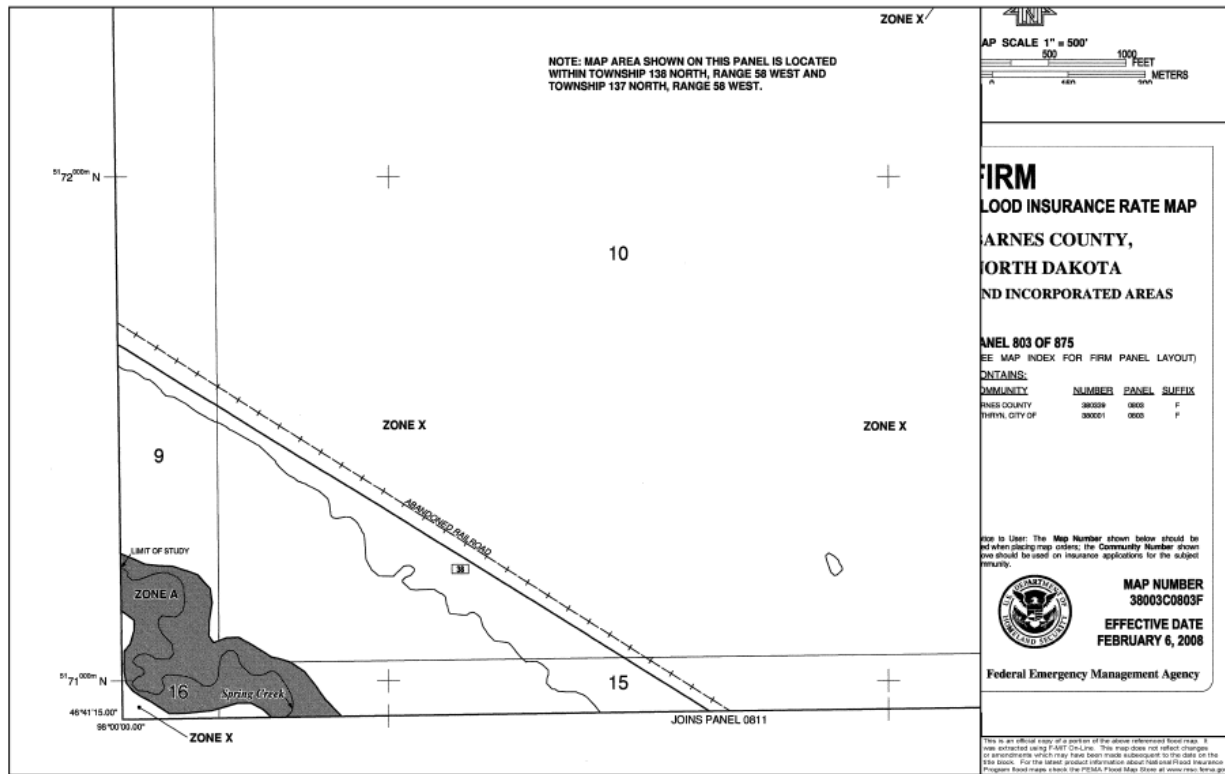


Figure 9.59 – Barnes County FEMA Flood Map

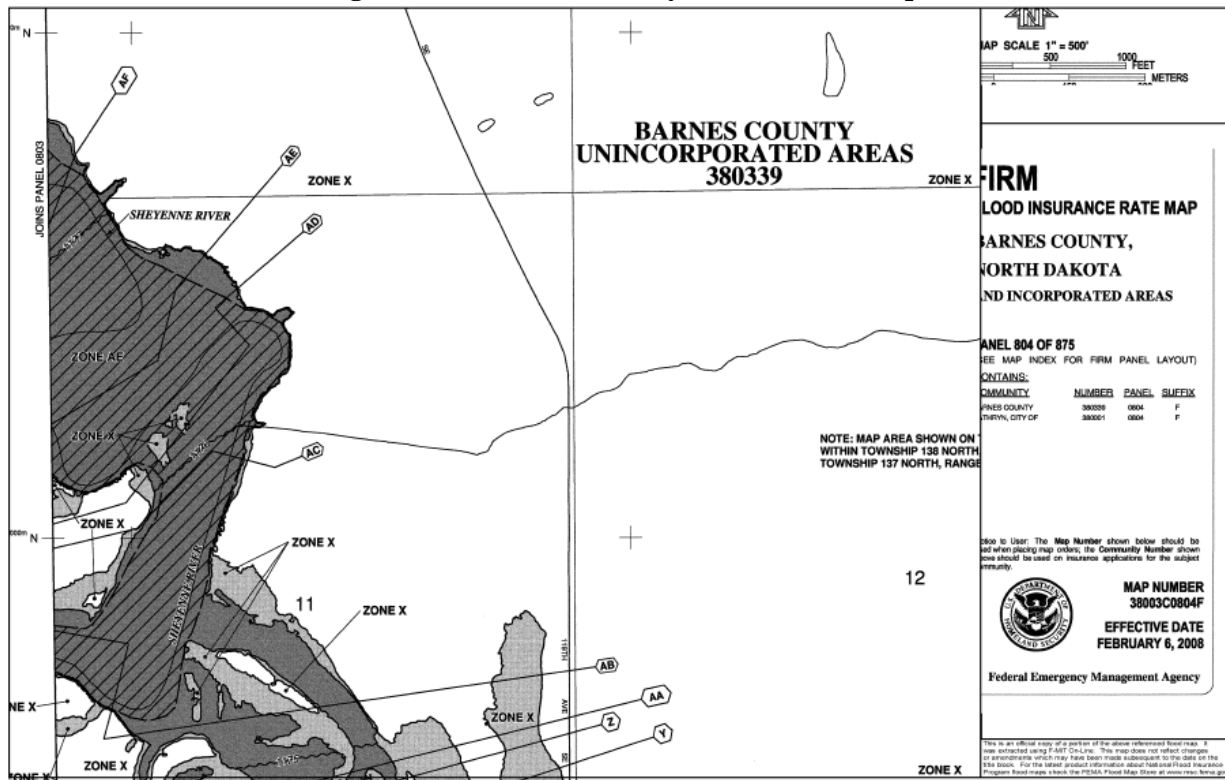


Figure 9.60 – Barnes County FEMA Flood Map

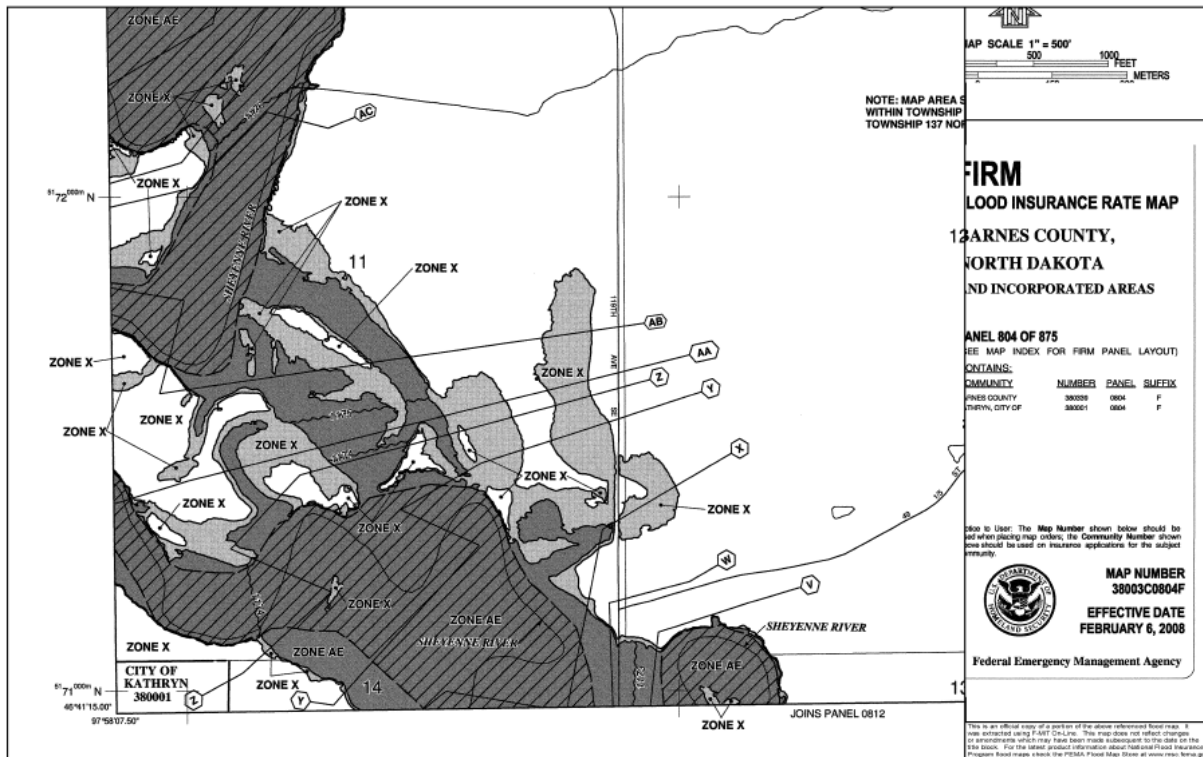


Figure 9.61 – Barnes County FEMA Flood Map

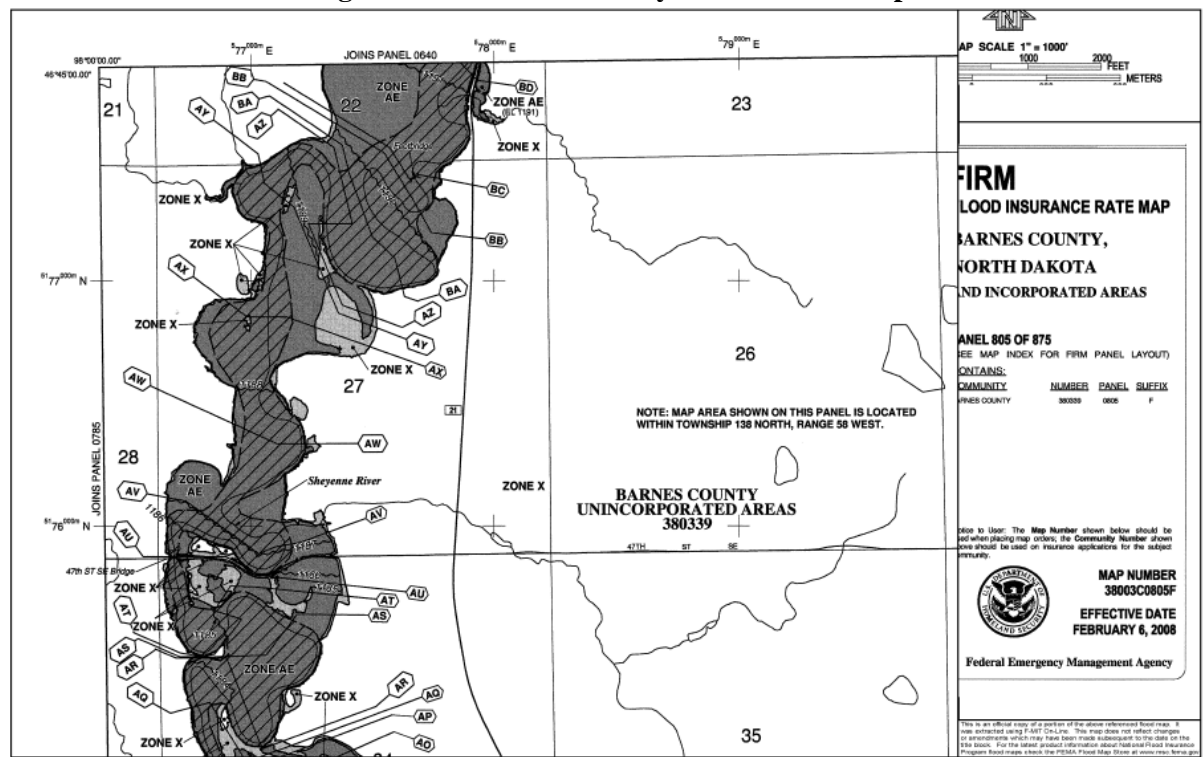


Figure 9.62 – Barnes County FEMA Flood Map

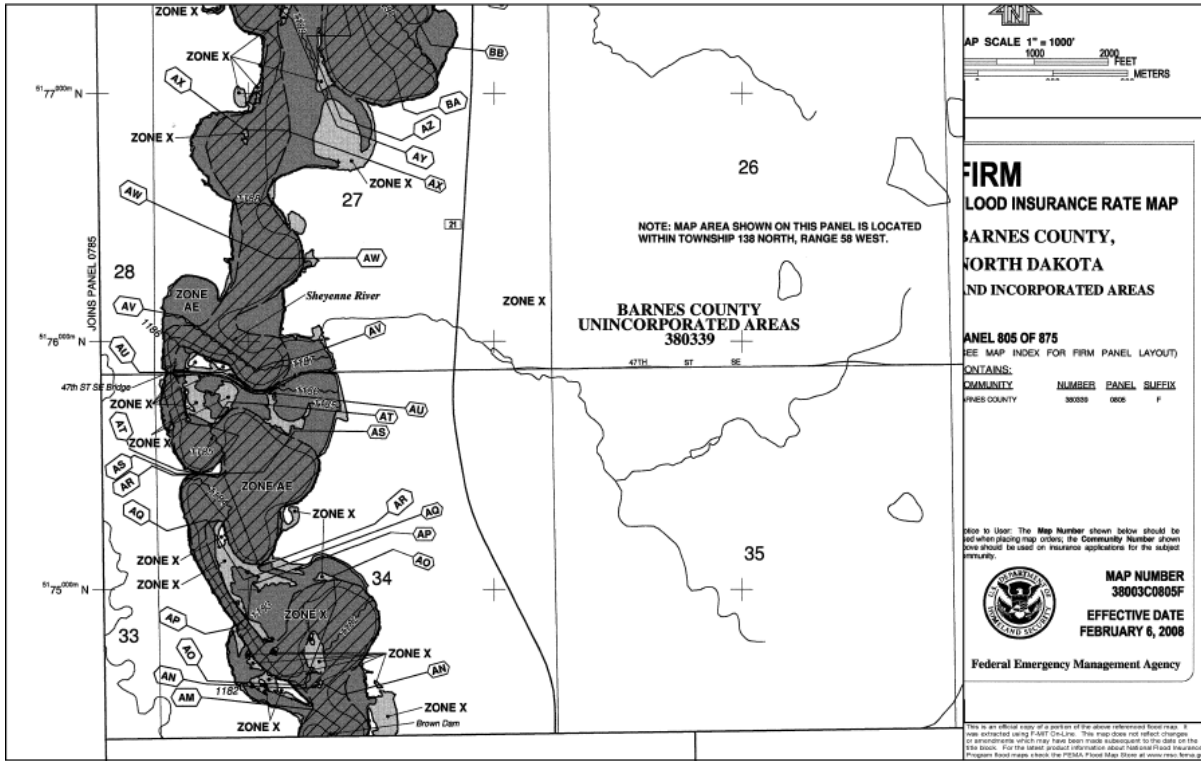


Figure 9.63 – Barnes County FEMA Flood Map

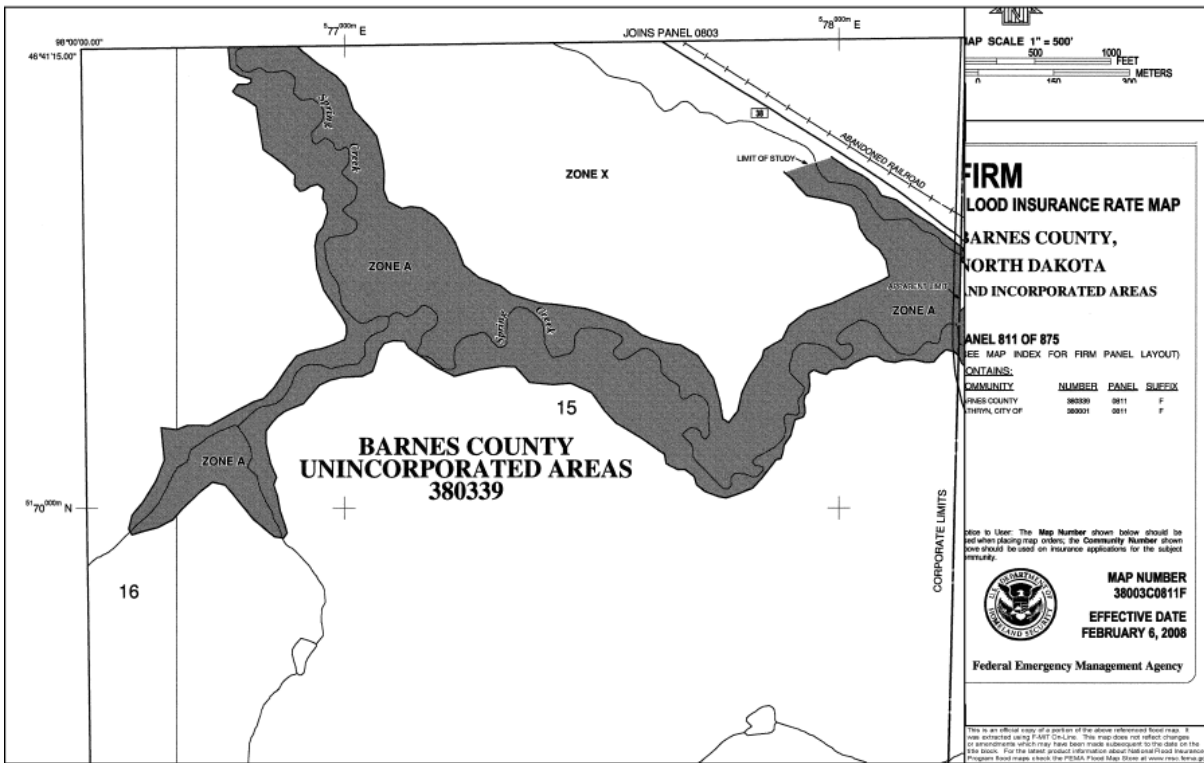


Figure 9.64 – Barnes County FEMA Flood Map

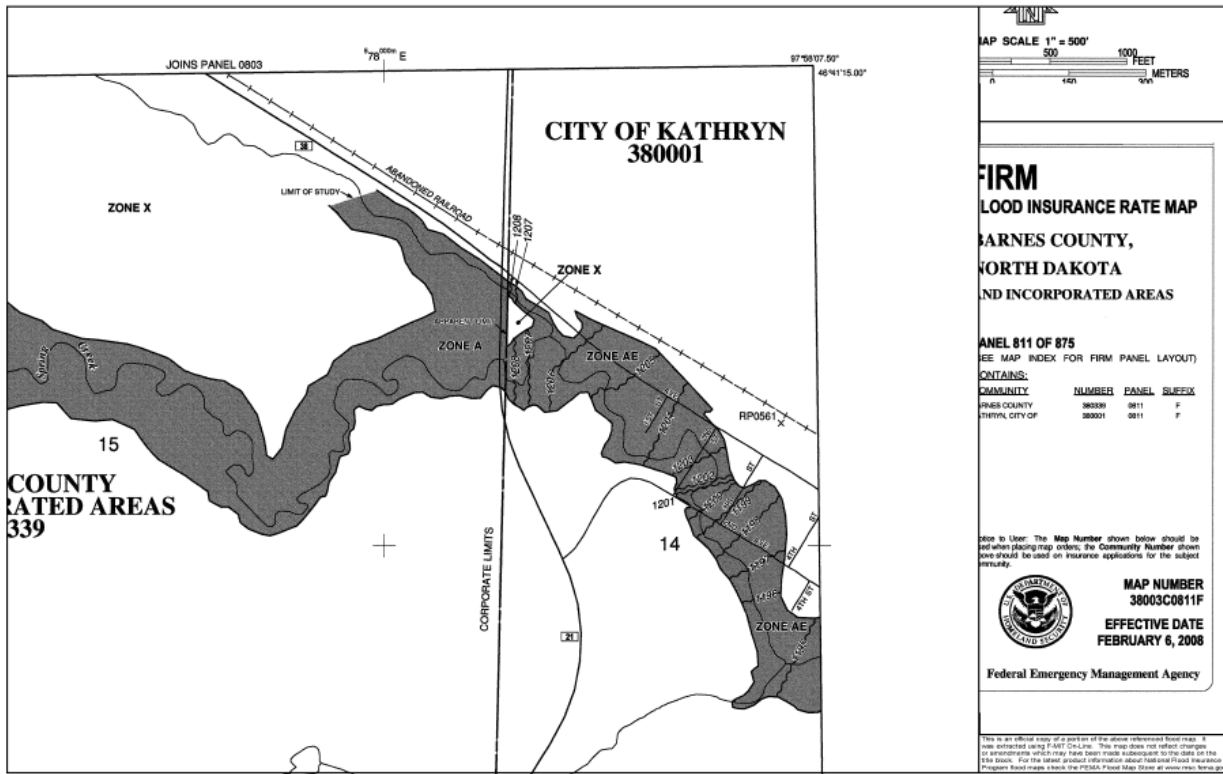


Figure 9.65 – Barnes County FEMA Flood Map

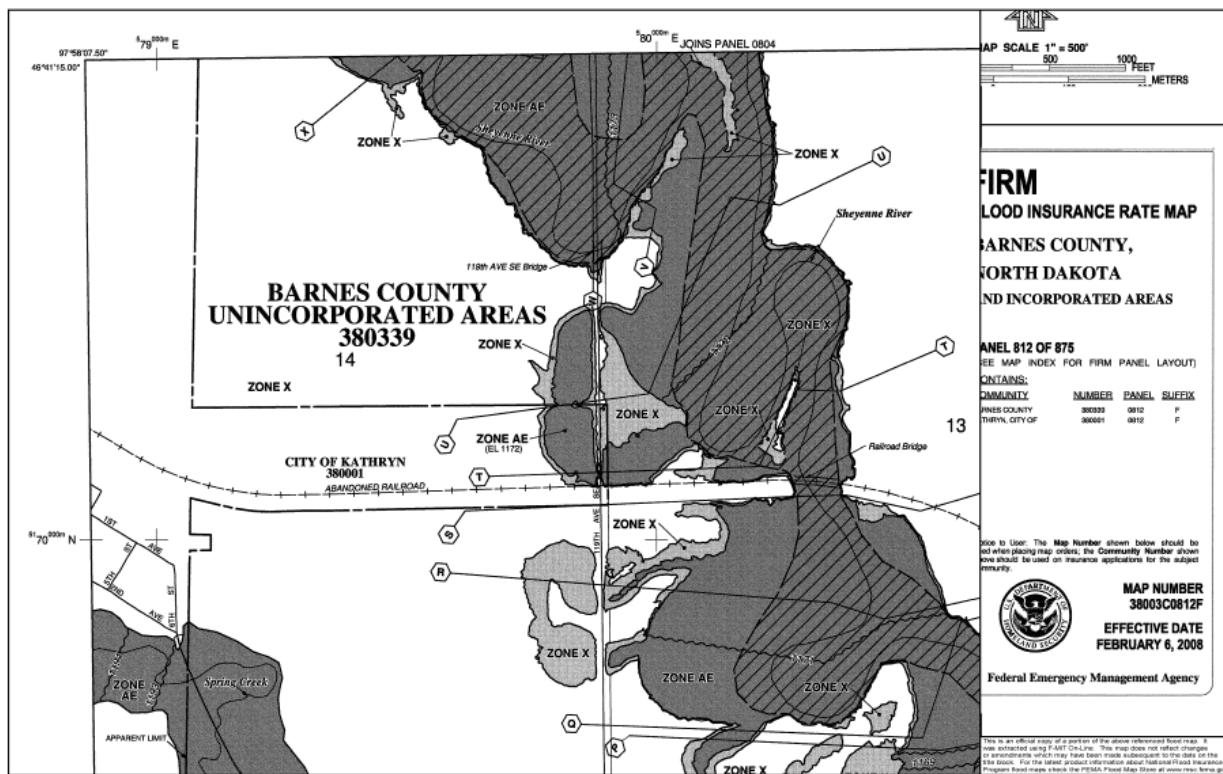


Figure 9.66 – Barnes County FEMA Flood Map

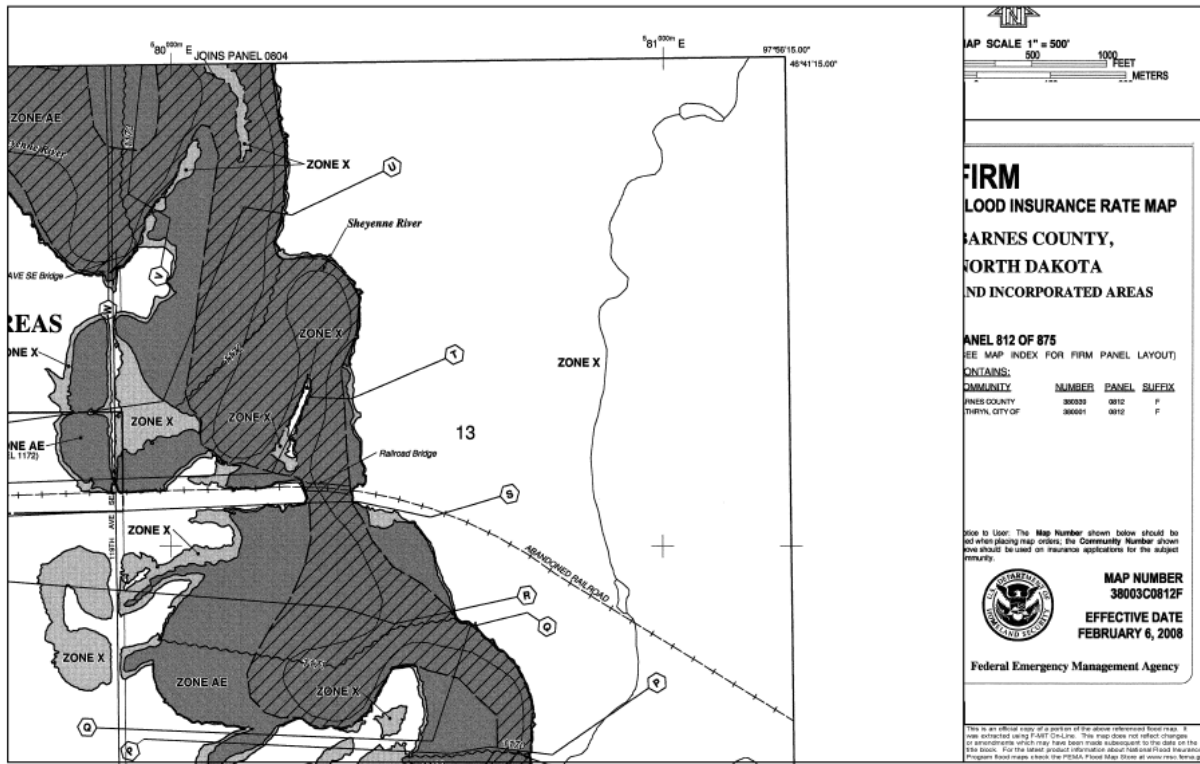


Figure 9.67 – Barnes County FEMA Flood Map

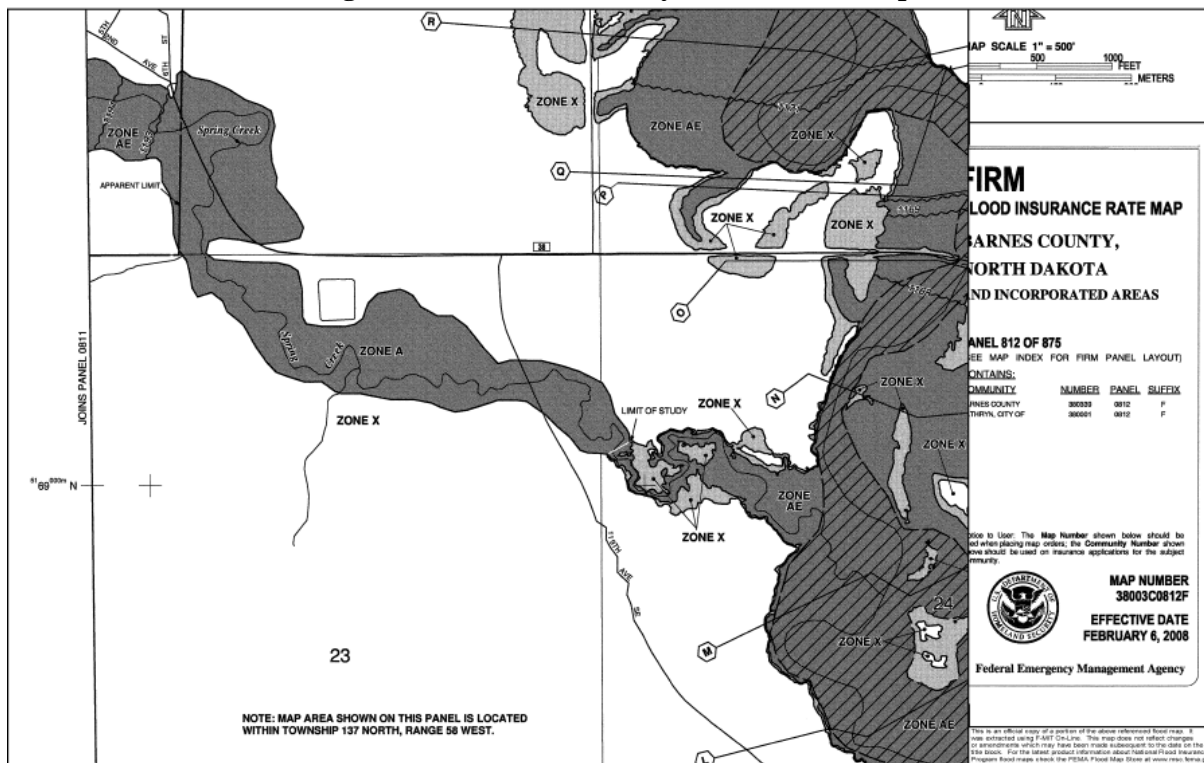


Figure 9.68 – Barnes County FEMA Flood Map

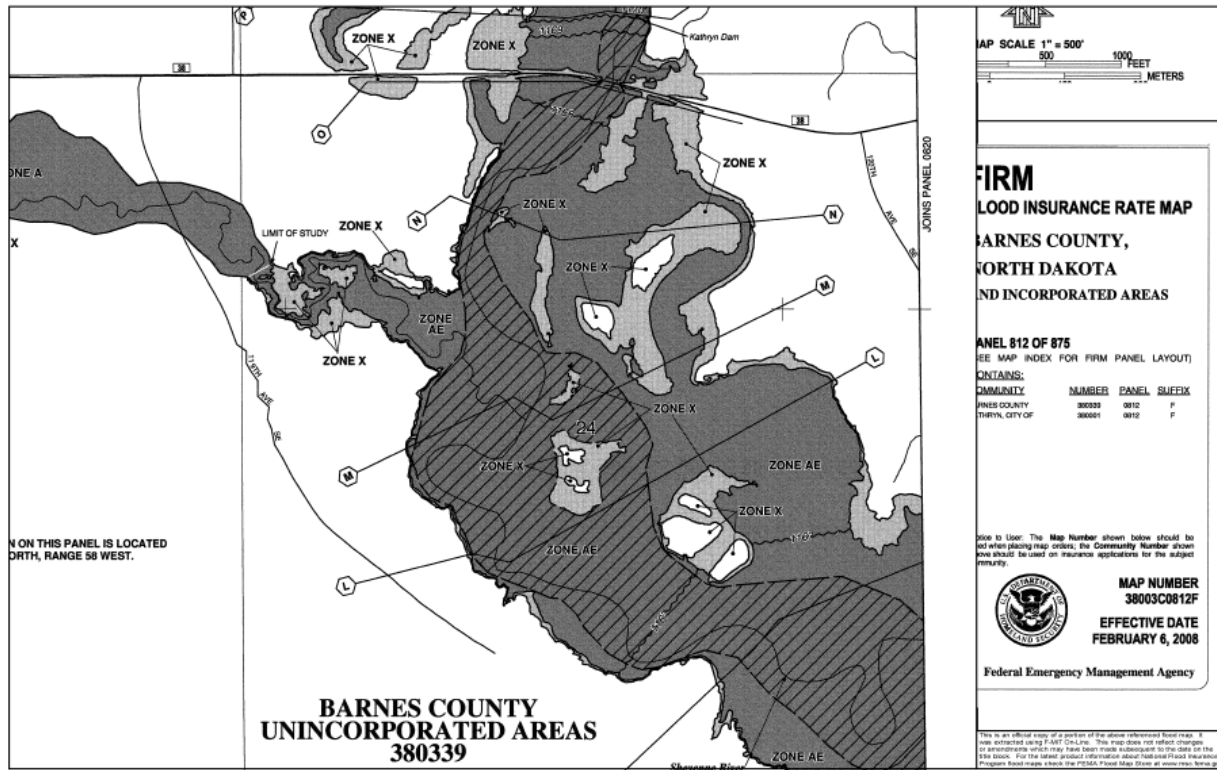


Figure 9.69 – Barnes County FEMA Flood Map

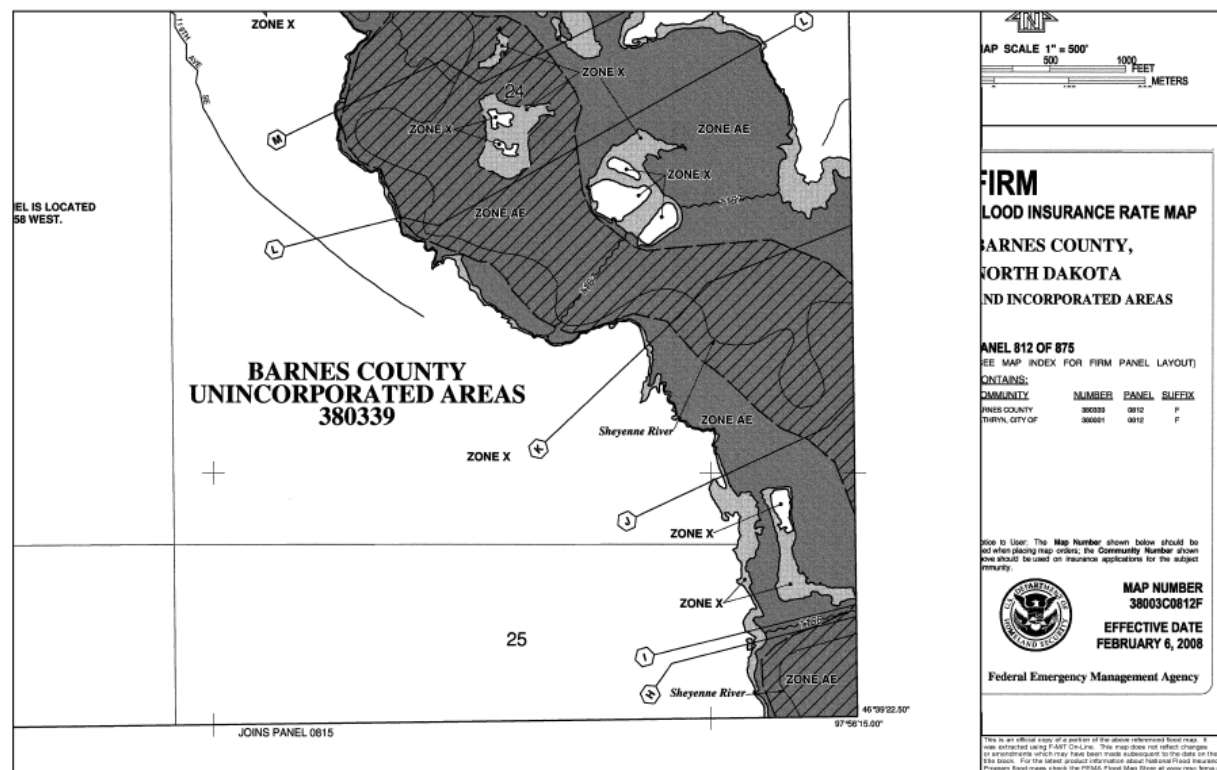


Figure 9.70 – Barnes County FEMA Flood Map

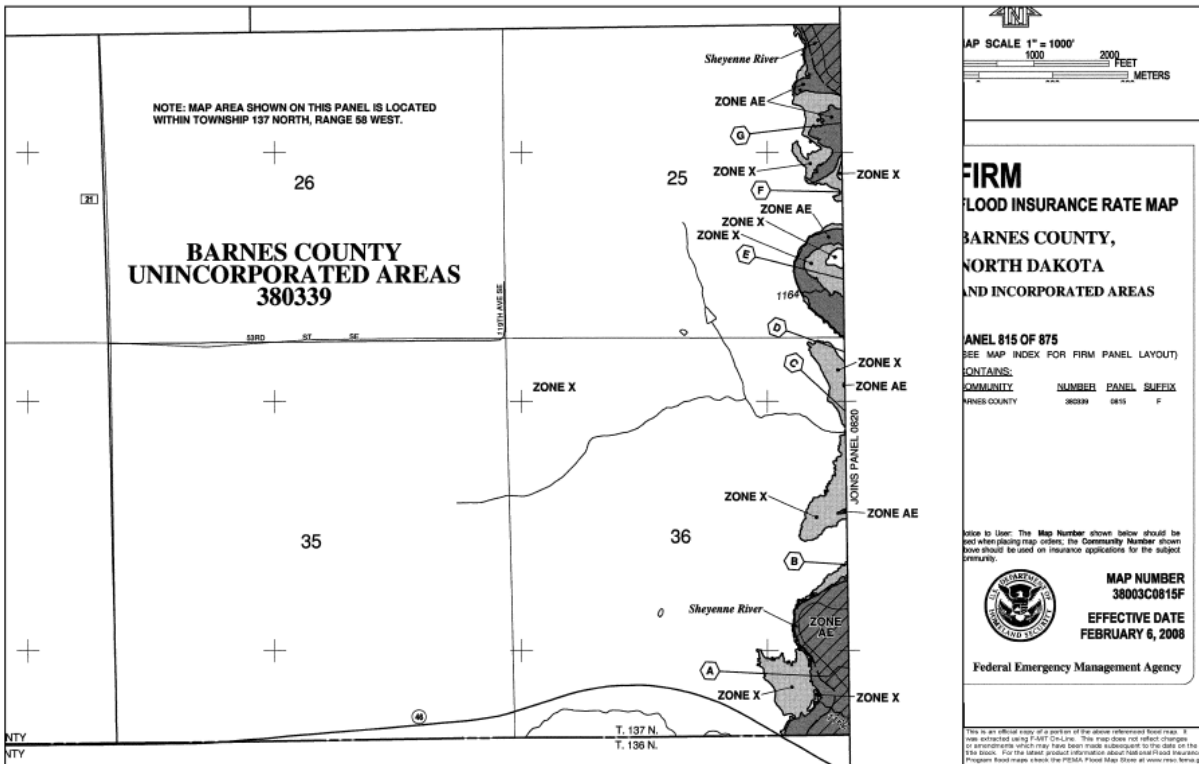


Figure 9.71 – Barnes County FEMA Flood Map

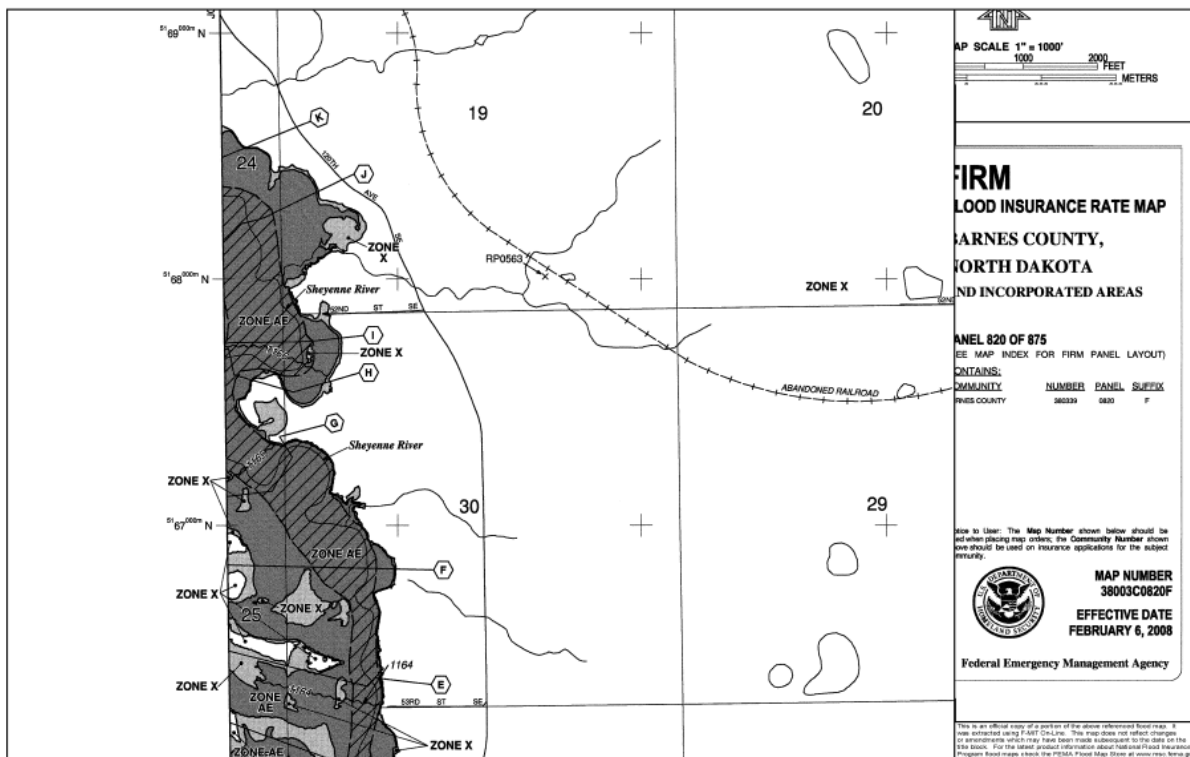
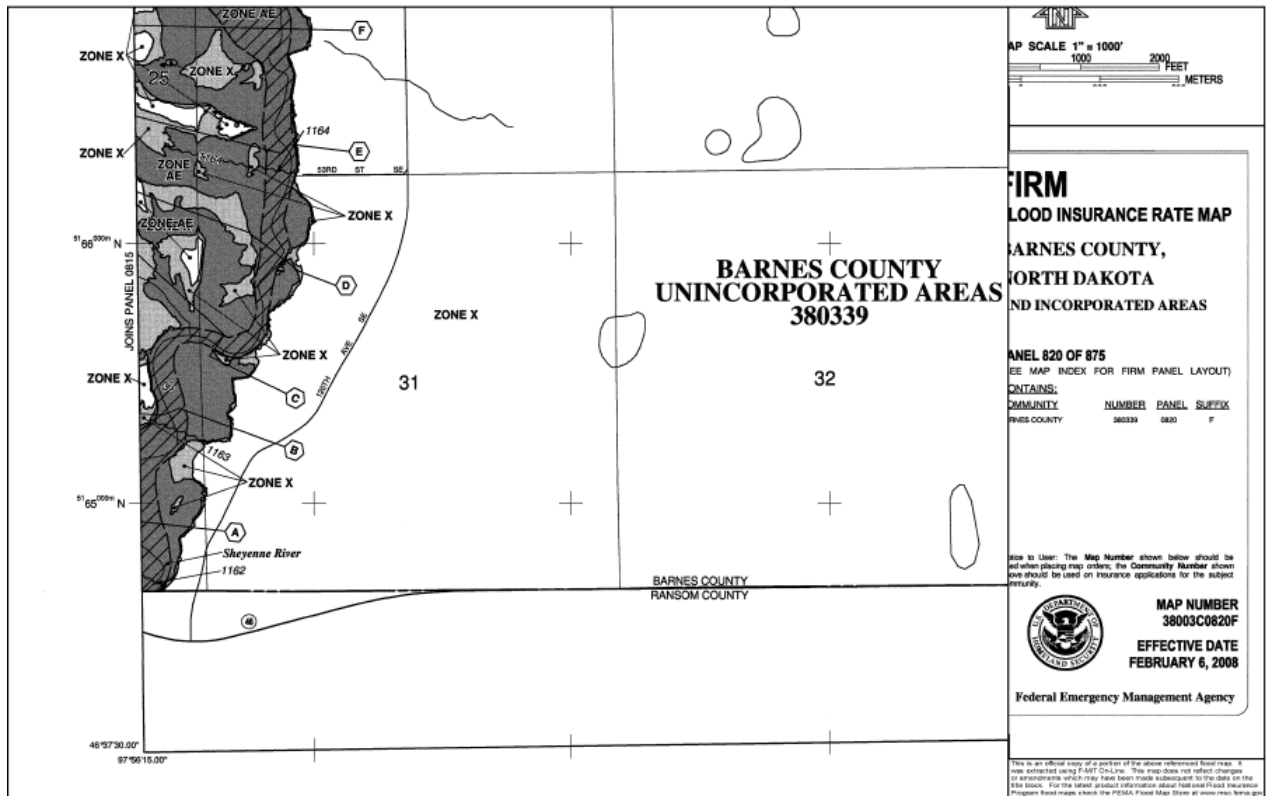


Figure 9.72 – Barnes County FEMA Flood Map



10. Plan Maintenance

The Barnes County multi-hazard mitigation planning is continuous. An important aspect of any useable plan is the maintenance and upkeep of the document. At any given time planning, risk analysis, updating the situation assessment, research, coordinating, disaster response or other activity is occurring. Thus, ensuring the plan will remain useful in the county for many years.

Plan Monitoring

The Barnes County emergency manager and the LEPC are responsible for monitoring, evaluating and updating the plan. All disaster and emergency incidents will be evaluated for general and specific hazard history and mitigation strategy recommendations to be added to the plan.

The plan will be updated and submitted to ND DES and FEMA within five years to assure the county maintains a FEMA-approved mitigation plan.

Plan Evaluation

At its February meeting each year each city and emergency response entity will review actions taken on mitigation projects and losses due to hazards in the past year. Sample forms for reporting are included in Chapter 10.1. The annual reports are due back to the emergency manager by March 15.

The comments about the plan, project implementation, and information will be shared through each jurisdiction's minutes, and these minutes will be sent to the county emergency management office. The emergency manager will share this information with the Barnes County Commission. The fire departments, law enforcement departments, county health department, and emergency medical services will be encouraged to constantly inform emergency management office of incidents as they occur so that the data can be considered immediately to better understand the risks in the county and enable accurate updating of hazard information.

Public Involvement

The public will be informed of the opportunity to comment on plan updates through the advertising of the jurisdiction meetings. The plan will be available to the public at the Barnes County Courthouse and at the city halls in each of the jurisdictions. During plan updates, the plan will also be on the county website. The public is encouraged to share input on the plan.

10.1. Annual Review of Hazard Impacts, Mitigation Projects and Report to Emergency Manager

Please complete as part of the February Jurisdictional Meeting:

Return to: Barnes County Emergency Manager
1525 12th St. NW
Valley City, ND 58072

Due: March 15

List injuries or property losses due to hazards in past year:

List new vulnerable areas that need to be addressed:

Identify what actions on jurisdiction's mitigation projects were taken in past year:

If no action, why:

Additional pages may be added if necessary.

City of Dazey, ND

Dazey City Council

Dazey, ND 58429

Resolution No. _____

A RESOLUTION OF THE CITY OF DAZEY ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Dazey; and

Whereas, the City of Dazey has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Dazey from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF DAZEY, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Dazey adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 3 in favor and 0 against, and ___ abstaining, this 4 day of May 2015.

By: Adam Mashburn

Adam Mashburn, Mayor

Attest:

By: Darlene Hare

Darlene Hare, Auditor

City of Fingal, ND

Fingal City Council

Fingal, ND 58031

Resolution No. _____

A RESOLUTION OF THE CITY OF FINGAL ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Fingal; and

Whereas, the City of Fingal has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Fingal from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF FINGAL, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Fingal adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 6 day of May 2015.

By: John Behm, Mayor

John Behm, Mayor

Attest: Corrine Ertelt

Corrine Ertelt, Auditor

City of Leal, ND
Leal City Council
Leal, ND 58479

Resolution No. _____

A RESOLUTION OF THE CITY OF LEAL ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Leal; and

Whereas, the City of Leal has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

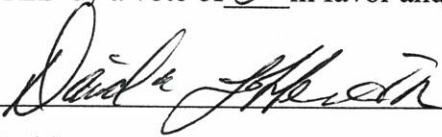
Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Leal from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF LEAL, NORTH DAKOTA, THAT:

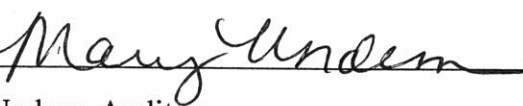
Section 1. In accordance with City Ordinances, the City of Leal adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, this 8th day of July 2015.

By: 

David Lokken, Jr., Mayor

Attest:

By: 

Mary Undem, Auditor

City of Litchville, ND

Litchville City Council

Litchville, ND 58461

Resolution No. _____

A RESOLUTION OF THE CITY OF LITCHVILLE ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Litchville; and

Whereas, the City of Litchville has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Litchville from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF LITCHVILLE, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Litchville adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 4th day of May 2015.

By: Brad Botner

Brad Botner, Mayor

Attest: Connie Smith

Connie Smith, Auditor

City of Kathryn, ND

Kathryn City Council

Kathryn, ND 58049

Resolution No. 5-2015

A RESOLUTION OF THE CITY OF KATHRYN ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Kathryn; and

Whereas, the City of Kathryn has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

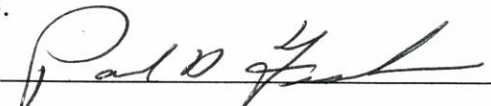
Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Kathryn from the impacts of future hazards and disasters; and

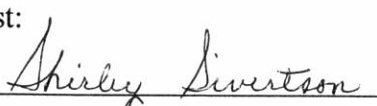
Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF KATHRYN, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Kathryn adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 3 in favor and 0 against, and abstaining, this 4th day of May, 2015.

By: 
Paul Fisher, Mayor

Attest:
By: 
Shirley Sivertson, Auditor

City of Nome, ND

Nome City Council

Nome, ND 58062

Resolution No. 10

A RESOLUTION OF THE CITY OF NOME ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Nome; and

Whereas, the City of Nome has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

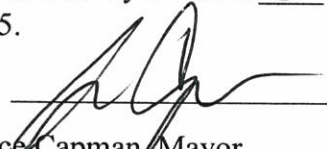
Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Nome from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF Nome, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Nome adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, this 7 day of MAY 2015.

By:  _____

Lance Capman, Mayor

Attest:

By:  _____

Alice Capman, Auditor

City of Oriska, ND

Oriska City Council

Oriska, ND 58063

Resolution No. 201

A RESOLUTION OF THE CITY OF ORISKA ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Oriska; and

Whereas, the City of Oriska has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

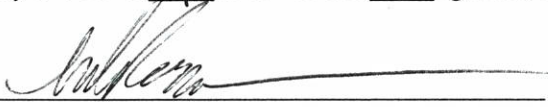
Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Oriska from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF ORISKA, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Oriska adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 4th day of May, 2015.

By: 

Rick Pommerer, Mayor

Attest:

By: 

Katie Pommerer, Auditor

City of Rogers, ND

Rogers City Council

Rogers, ND 58479

Resolution No. _____

A RESOLUTION OF THE CITY OF ROGERS ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Rogers; and

Whereas, the City of Rogers has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

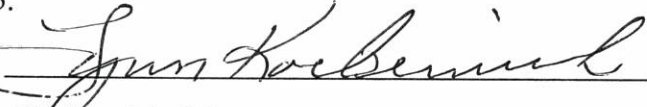
Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Rogers from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

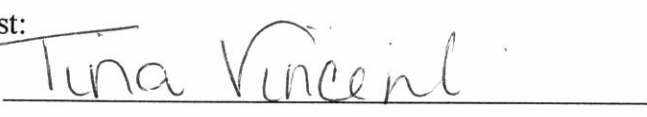
NOW THEREFORE, BE IT RESOLVED BY THE CITY OF ROGERS, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Rogers adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this 4 day of May, 2015.

By: 

Lynn Koebernick, Mayor

Attest: 

Tina Vincent, Auditor

City of Pillsbury, ND

Pillsbury City Council

Pillsbury, ND 58065

Resolution No. _____

A RESOLUTION OF THE CITY OF PILLSBURY ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Pillsbury; and

Whereas, the City of Pillsbury has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Pillsbury from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF PILLSBURY, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Pillsbury adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 4 in favor and 0 against, and _____ abstaining, this 22 day of June, 2015.

By:  _____

Dan Lindsith, Mayor

Attest:

By:  _____

Dennis McGuire, Auditor

City of Valley City, ND

Valley City Council

Valley City, ND 58072

Resolution No. 2024

A RESOLUTION OF THE CITY OF VALLEY CITY ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Valley City; and

Whereas, the City of Valley City has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Valley City from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF VALLEY CITY, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Valley City adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this 16 day of June 2015.

By: Robert J. Werkhoven

Robert Werkhoven, Mayor

Attest:

By: Avis Richter

Avis Richter, Auditor

City of Wimbledon, ND
Wimbledon City Council
Wimbledon, ND 58581

Resolution No. 92

A RESOLUTION OF THE CITY OF WIMBLEDON ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Wimbledon; and

Whereas, the City of Wimbledon has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Wimbledon from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF WIMBLEDON, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Wimbledon adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 4 in favor and 0 against, and 0 abstaining, this 4 day of May 2015.

By: Roger Pickar

Roger Pickar, Mayor

Attest:

By: Leon Doyle

Leon Doyle, Auditor

City of Sanborn, ND

Sanborn City Council

Sanborn, ND 58480

Resolution No. _____

A RESOLUTION OF THE CITY OF SANBORN ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Sanborn; and

Whereas, the City of Sanborn has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and


Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Sanborn from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

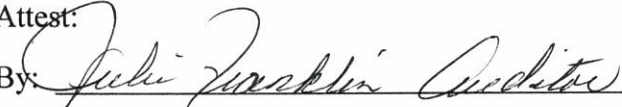
NOW THEREFORE, BE IT RESOLVED BY THE CITY OF SANBORN, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Sanborn adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of X in favor and ___ against, and ___ abstaining, this ___ day of ___, 2015.

By:  _____

Nikki Grebel, Mayor

Attest:  _____

Julie Franklin, Auditor

City of Sibley, ND

Sibley City Council

Sibley, ND 58429

Resolution No. 2015-1

A RESOLUTION OF THE CITY OF SIBLEY ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the City Council recognizes the threat that natural hazards pose to people and property within Sibley; and

Whereas, the City of Sibley has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Sibley from the impacts of future hazards and disasters; and

Whereas, adoption by the City Council demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE CITY OF SIBLEY, NORTH DAKOTA, THAT:

Section 1. In accordance with City Ordinances, the City of Sibley adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 3 in favor and 0 against, and 0 abstaining, this 6 day of May 2015.

By: Allen W Bender

Allen Bender, Mayor

Attest:

By: Typhanny Schuler

Typhanny Schuler, Auditor

County of Barnes, ND
Barnes County Commission
Barnes ND 58072

Resolution No. 2015-6

A RESOLUTION OF THE COUNTY OF BARNES ADOPTING THE BARNES COUNTY, NORTH DAKOTA, MULTI-JURISDICTIONAL MULTI-HAZARD MITIGATION PLAN, 2015

Whereas, the County Commission recognizes the threat that natural hazards pose to people and property within Barnes County; and

Whereas, the County of Barnes has prepared a multi-hazard mitigation plan, hereby known as Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 in accordance with the Disaster Mitigation Act 2000; and

Whereas, Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Barnes County from the impacts of future hazards and disasters; and

Whereas, adoption by the County Commission demonstrates their commitment to the hazard mitigation and achieving the goals outlined in the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

NOW THEREFORE, BE IT RESOLVED BY THE COUNTY OF BARNES, NORTH DAKOTA, THAT:


Section 1. In accordance with County Ordinances, the County of Barnes adopts the Barnes County, North Dakota, Multi-Jurisdictional Multi-Hazard Mitigation Plan, 2015.

ADOPTED by a vote of 5 in favor and 0 against, and 0 abstaining, this 5th day of May 2015.

By: 

Cindy Schwehr, Barnes County Commission Chairman

Attest:

By: 

Beth Didier, Barnes County Auditor