

2025  
**MULTI-HAZARD  
MITIGATION PLAN**

Billings Dunn  
Golden Valley  
Stark Counties

April 2026



## Acknowledgements

The 2025 Multi-Hazard Mitigation Plan project would not have been possible without the assistance of planning team members and State and local stakeholders. The Project Team included the following individuals:

- **Alaynea Decker** (Stark County Director of Emergency Services)
- **Sarah Duttenhefner** (Dunn County Emergency Manager)
- **Rachel Keohane** (Golden Valley County Emergency Manager)
- **Kyle Shockley** (Billings County Emergency Manager)

The project was primarily funded with a grant awarded through the FEMA Pre-Disaster Mitigation Program, administered by the North Dakota Department of Emergency Services (DES). DES staff provided valuable guidance throughout the project. The project team would especially like to thank the following individuals:

- **Hope Brighton** (DES Lead Mitigation and Recovery Planner)
- **Greg Gust** (DES Meteorologist and Climate Lead)

The 2025 Multi-Hazard Mitigation Plan was completed in consultation with SRF Consulting Group, Inc.



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An aerial photograph of a river valley. The river flows through a lush green forested area in the foreground and middle ground. The surrounding hills are characterized by distinct horizontal terracing, suggesting agricultural terraces or natural geological layers. The sky is filled with soft, white clouds, and the overall lighting is bright and natural. The text 'PLAN OVERVIEW' is superimposed in the center of the image.

# PLAN OVERVIEW

# Hazard Mitigation Planning

Natural and human-caused hazards impact residents and property in the four-county region of Billings, Dunn, Golden Valley, and Stark County, North Dakota. While it is impossible to eliminate most hazards, it is possible to mitigate their negative effects. “Hazard mitigation” refers to any sustained action taken to reduce or eliminate long-term risks to human life and property from hazards. These actions can be implemented before, during, or after an event, but are most effective when based on a long-term plan developed before disasters occur. Successful mitigation strategies must be practical, cost-effective, politically feasible, and supported by a solid planning process.

## Plan Purpose

The purpose of the Billings-Dunn-Golden Valley-Stark Counties Multi-Hazard Mitigation Plan (“Multi-Hazard Mitigation Plan” or “MHMP”) is to conduct a thorough risk assessment and capabilities assessment for each county in the study area. This assessment will inform a mitigation strategy to enhance / build community resilience with the goal of reducing or eliminating the impact from disasters. The Federal Emergency Management Agency (FEMA) identifies the primary benefits of hazard mitigation planning as:

- Identifying actions for risk reduction that are agreed upon by stakeholders and the public.
- Focusing resources on the greatest risks and vulnerabilities.
- Building partnerships by involving citizens, organizations, and businesses.
- Increasing education and awareness of threats and hazards.
- Communicating priorities to state and federal officials.
- Aligning risk reduction with other community objectives.

The MHMP aims to develop effective strategies and actions to reduce or eliminate long-term risks to human life and property. By establishing a comprehensive, long-term mitigation strategy, the MHMP seeks to enhance community resilience, ensure the safety of residents, and minimize the negative impacts of future disasters. Through proactive planning, the MHMP also provides a framework for monitoring, updating, and maintaining mitigation efforts to ensure their continued effectiveness and relevance.

## Federal Hazard Mitigation Programs

All adopting jurisdictions are eligible to apply for funds through FEMA’s Hazard Mitigation Assistance Program (HMA). This program provides federal funding to communities through the Hazard Mitigation Grant Program (HMGP) and the Flood Mitigation Assistance (FMA) program.

The MHMP includes a risk and vulnerability assessment that residents, local governments, and organizations can use to plan for hazards. It also includes a list of mitigation projects and actions designed to help each adopting jurisdiction reduce risk and prevent loss from future hazard events.

Additionally, the MHMP is designed to meet the requirements set by the Federal Emergency Management Agency (FEMA) for local hazard mitigation planning and to ensure eligibility for federal funding and resources to support mitigation projects.

## Plan Organization

The MHMP is organized into five chapters:

- **Chapter 1. Introduction:** Plan overview.
- **Chapter 2. Study Area Background:** Background information about each participating jurisdiction.
- **Chapter 3. Hazard Risks and Vulnerabilities:** Hazard profiles, risk and vulnerability assessments, and key issues.
- **Chapter 4. Mitigation Strategies:** Goals, strategies, and actions to mitigate hazard risks in each participating jurisdiction.
- **Chapter 5. Plan Maintenance:** Procedures for monitoring, evaluating, and updating the plan.

## Authority

The legal basis for state, local, and Tribal governments to reduce risks from natural hazards through mitigation planning is provided by the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000. This Act requires that all state, local, and Tribal governments maintain an approved Multi-Hazard Mitigation Plan to be eligible for certain types of non-emergency disaster assistance, including funding for mitigation projects.

The 2025 MHMP serves as an update to 2020 MHMP. According to FEMA guidelines, hazard mitigation plans must be updated every five years to ensure continued eligibility for grant funding, including through the HMGP and FMA programs.

To remain eligible for future funding, jurisdictions must adopt the plan and actively participate in the planning process or be sponsored by a

jurisdiction that has adopted the plan. **Table 1** lists all jurisdictions that participated in the planning process. All documentation related to the approval and adoption of the MHMP can be found in **Appendix A**. Additionally, this plan complies with FEMA's requirements for hazard mitigation planning and is a critical component of building resilience within the region.

**Table 1. Participating Jurisdictions**

| Jurisdiction                |
|-----------------------------|
| <b>Billings County</b>      |
| Medora                      |
| <b>Dunn County</b>          |
| Dodge                       |
| Dunn Center                 |
| Halliday                    |
| Killdeer                    |
| <b>Golden Valley County</b> |
| Beach                       |
| Golva                       |
| Sentinel Butte              |
| <b>Stark County</b>         |
| Belfield                    |
| Dickinson                   |
| Gladstone                   |
| Richardton                  |
| South Heart                 |
| Taylor                      |

## Planning Process

A structured and effective mitigation planning process is crucial to identifying and reducing risks from natural and human-caused hazards. This process outlines the essential steps in the hazard mitigation planning process, as recommended by FEMA, to ensure that Billings, Dunn, Golden Valley, and Stark Counties are prepared to mitigate risks effectively.

## PUBLIC ENGAGEMENT PROCESS

Public engagement activities and stakeholder outreach were conducted throughout the MHMP planning process. Engagement opportunities were promoted online and in-person via social media and flyers. Activities included planning workshops, community pop-up events (café kiosks), a community survey, and focused discussions with the City of Dickinson. Public engagement was essential for promoting the project and ensuring that MHMP accurately reflects community needs and priorities are accurately reflected in the MHMP. Key insights are highlighted throughout the MHMP document.



**Billings-Dunn-Golden Valley-Stark Multi-Hazard Mitigation Plan**

**2025 Multi-Hazard Mitigation PLAN**

The MHMP aims to identify risks, improve resilience, and mitigate future natural hazard and man-made threats. Your input will help shape policies and actions that protect our communities.

**Take the Survey!**

[www.snoyork.com/2/StarkCountyMHMP](http://www.snoyork.com/2/StarkCountyMHMP)

**Workshop Series #1**

Join us for a public workshop in your county! All workshops are scheduled from 6-8 a.m.

- **Golden Valley** – April 2<sup>nd</sup> at Beach Community Center (153 Main St.)
- **Billings** – April 22 at Medora Community Center (465 Pacific Ave.)
- **Dunn** – April 23 at Wiles Dunn Fire (220 Central Ave S in Dunn Center)
- **Stark** – April 24 at Veterans Pavilion (801 5th Ave W in Dickinson)

## Stakeholder Participation

**Table 2** shows how each jurisdiction participated in the MHMP update.

**Table 2. Stakeholder Participation Activities**

| Jurisdiction         | PMT | WS1 | WS2 | Café Kiosk | Survey | Plan Review |
|----------------------|-----|-----|-----|------------|--------|-------------|
| <b>Billings</b>      | ✓   | ✓   | ✓   |            | ✓      | ✓           |
| Medora               |     | ✓   | ✓   | ✓          | ✓      | ✓           |
| <b>Dunn</b>          | ✓   | ✓   | ✓   |            | ✓      | ✓           |
| Dodge                |     | ✓   |     |            |        | ✓           |
| Dunn Center          |     | ✓   | ✓   |            |        | ✓           |
| Halliday             |     | ✓   |     |            | ✓      | ✓           |
| Killdeer             |     | ✓   | ✓   | ✓          | ✓      | ✓           |
| <b>Golden Valley</b> | ✓   | ✓   | ✓   | ✓          | ✓      | ✓           |
| Beach                |     | ✓   | ✓   | ✓          | ✓      | ✓           |
| Golva                |     |     |     |            | ✓      | ✓           |
| Sentinel Butte       |     |     |     |            |        | ✓           |
| <b>Stark</b>         | ✓   | ✓   | ✓   |            | ✓      | ✓           |
| Belfield             |     | ✓   | ✓   |            | ✓      | ✓           |
| Dickinson*           |     | ✓   | ✓   | ✓          | ✓      | ✓           |
| Gladstone            |     |     |     |            |        | ✓           |
| Richardton           |     | ✓   |     |            | ✓      | ✓           |
| South Heart          |     |     |     |            |        | ✓           |
| Taylor               |     |     |     |            |        | ✓           |

Notes:

- **WS 1:** Community represented at Workshop 1
- **WS 2:** Community represented at Workshop 2
- **Café Kiosk:** Pop-up event held in this community
- **PMT:** County emergency manager participated on Project Management Team
- **Survey:** Community residents responded to survey

\*A standalone focus group was conducted with Dickinson City staff.

## Plan Review

All communities were invited to review the draft plan. Four communities participated in the planning process by providing review and approval of the plan; no comments were received:

- **Gladstone** – Acknowledgement of review and approval received via email from city auditor on April 7, 2026
- **Taylor** – Acknowledgement of review and approval received via email from city auditor on March 12, 2026
- **Sentinel Butte** – Acknowledgement of review and approval received via email from mayor on March 31, 2026
- **South Heart** – Acknowledgement of review and approval received via email from mayor on April 7, 2026

In addition to those listed, the draft plan was provided to the neighboring counties of Grant, Hettinger, McKenzie, McLean, Mercer, Morton, Mountrail, Slope, and Wibaux (MT), and to MHA Nation in March and April of 2026. No comments were received.

## Stakeholder Workshops

### Workshop Series #1

The first series of public workshops was conducted in April 2025 as follows:

- April 21 – Beach Community Center (Golden Valley)
- April 22 – Medora Community Center (Billings)
- April 23 – West Dunn Fire Rescue (Dunn)
- April 24 – Veterans Pavilion (Stark)



The workshops were advertised via social media, flyers, and a pop-up event conducted in each county on the day of its workshop. In addition, email invitations were sent to key stakeholders identified by each county's Emergency Manager.

The first workshop series was focused on gathering input about hazard risks and vulnerabilities. Activities included scenario planning, interactive mapping, and live polling. The community survey was also promoted.

### Workshop Series #2

A second series of public workshops was conducted in August 2025 as follows:

- August 25 – Killdeer Fire Hall (Dunn)
- August 26 – Stark-Billings County NDSU Extension (Stark)
- August 27 – Beach Community Center (Golden Valley)
- August 28 – Medora Community Center (Billings)

The workshops were advertised to people who participated in Workshop Series #1 and those who provided their contact information on the public survey.

**Appendix B** documents participation and input received from both workshop series.



*Workshop Series #1 was conducted in April 2025. Pictured above is the workshop at West Dunn Fire Hall (Dunn County).*

## Community Conversations

To broaden the reach of engagement and promote the survey and the first series of public workshops, a pop-event was conducted in each county:

- April 21, 2025 – Badlands Barista in Beach (Golden Valley)
- April 22, 2025 – Medora C-Store (Billings)
- April 23, 2025 – Garcia's Coffee Shop in Killdeer (Dunn)
- April 24, 2025 – City Brew Coffee in Dickinson (Stark)

## Community Survey

The survey was distributed online via SurveyMonkey and via hard copy and was open from April 7 through June 30, 2025. County emergency managers promoted the survey through their social media channels in April, May, and June. In addition, the survey was promoted at community conversations and Workshop Series #1.



A total of 64 responses were collected, including 10 residents of Billings County, 12 residents of Dunn County, seven residents of Golden Valley County, and 33 residents of Stark County, with two unknown. **Appendix C** includes detailed survey response data. The main themes are summarized below.

**Hazard Threats.** Respondents were primarily concerned with severe winter weather, severe winter weather, drought, and wildfire.

**Hazard Impacts.** Respondents were mostly concerned with power loss, utility impacts, and damage to structures or infrastructure.



**Local Government Perception.** Nearly half of respondents believe that their local government is adequately prepared for disasters, with one-third saying “No” and the remainder uncertain.

**Hazard Damages.** Fifteen respondents (23%) indicated that they had experienced at least \$10,000 in damages due to natural disasters in the past five years – primarily damage to structures and vehicles.



**Household Mitigation.** About half of respondents have an emergency kit, while 1 in 4 has taken steps to clear vegetation or fire-prone materials around the home.

**Storm Shelters.** Respondents identified several sites that potentially benefit from installation of a prefabricated storm shelter. Generally, these sites are owned by public or nonprofit entities. They include empty lots in Dickinson, the Medora Campground and Red Trail Campground, and public recreation/open space areas, such as the fairgrounds, old track field, and swimming pool park in Golden Valley County. Similarly, existing buildings that could potentially serve as an emergency shelter include community centers, churches, and schools.

**Roadway Flooding.** Thirty respondents identified roads or infrastructure that have been impacted by flooding, drainage issues, or other hazards. The Highway 22 railroad underpass in Dickinson was mentioned eight times. Additional locations include the I-94 Business Route in Medora, Central Avenue in Beach, High Street and Railroad Street in Killdeer, Old Highway 10 in Stark County, Highway 8 near Halliday, and Highway 23 near Manning.



**Mitigation Priorities.** The top two areas for enhancing community resilience were improving emergency communication systems (37%) and expanding public education and training efforts (29%).



## Dickinson Focus Group

The project team met with staff from the City of Dickinson and Stark County on June 4, 2025, to discuss city-specific issues and review the recommendations from the 2020 Multi-Hazard Mitigation Plan.

Attendees included:

- **Josh Skluzacek** (Dickinson Engineering and Community Development Director)
- **Mark Selle** (Dickinson Deputy Fire Chief)
- **Natalie Birchak** (Dickinson City Planner)
- **Alaynea Decker** (Stark County Director of Emergency Services)

Focus group discussion was used to update the mitigation strategies and action items for Dickinson, which are provided in Chapter 4.

## DATA COLLECTION & METHODOLOGY

Understanding historical trends is imperative for projecting the probability and impact of future hazard events. Likewise, maps show us where hazards have historically occurred and can give us a sense of where hazards may occur in the future.



This project involved substantial efforts to collect and report historical data. Data presented throughout this document were obtained from a variety of federal, state, and local sources. Maps, tables, and charts include notes to sources.

## EXISTING PLANS AND STUDIES

Several existing plans and studies have been incorporated into the Multi-Hazard Mitigation Plan. These include:

- Dickinson Comprehensive Plan (Direction 2050)
- Medora Area Plan
- Killdeer Comprehensive Plan
- Stark County Comprehensive Plan
- County FIRM updates

These plans are designed to guide growth and development of the region over the next 10-20 years. They were reviewed to understand where growth is likely to occur (which informed the vulnerability assessment) as well as identified infrastructure needs and planned infrastructure projects, some of which are directly related to mitigation (e.g., expansion of water supply systems and water storage capacity in Medora). For additional details regarding community growth, see Chapter 2 – Study Area Background.

Stark County's Comprehensive Plan includes an element for Emergency Services. Mitigation strategies and actions from Stark County's plan were incorporated into the Multi-Hazard Mitigation Plan.

Since the previous MHMP was adopted, flood hazard maps were updated for Golden Valley County and Stark County. The new flood zones have been incorporated into this Plan. Note that Sentinel Butte now participates in the National Flood Insurance Program (NFIP), but no Special Flood Hazard Areas are identified for the City. Therefore, this Plan does not include a flood hazard map for Sentinel Butte. For additional details regarding flood risk, see the Flood section in Chapter 3 – Hazard Risks and Vulnerabilities.



# STUDY AREA BACKGROUND



## Study Area Overview



The study area comprises approximately 30 percent of the land area south and west of the Missouri River in North Dakota, encompassing the counties of Billings, Dunn, Golden Valley, and Stark. Billings County contains just one municipality (Medora), while the other counties contain several.

**Figure 1** depicts the study area. The region is characterized by diverse terrain, including rolling agricultural land and the rugged Badlands. The area is served by a network of major highways, including Interstate 94, US Highway 85, and State Highways 8, 16, 22, and 200. The BNSF railroad extends through the central portion of Stark, Billings, and Golden Valley Counties, linking several communities including Beach, Medora, Belfield, South Heart, Dickinson, Gladstone, and Richardton.

The study area is highly rural – particularly Billings, Dunn, and Golden Valley Counties. The population density (persons per square mile) for each county is:

- Billings: 0.81
- Dunn: 1.97
- Golden Valley: 1.73
- Stark: 25.09

Rural areas have unique challenges for hazard mitigation planning. For example, very rural areas have lower levels of service delivery and landowner oversight. While the likelihood of fire ignition is higher in more heavily populated areas, there could be greater opportunities for fire to spread unchecked in rural areas.

## Population Trends

### HISTORICAL POPULATION TRENDS

**Table 3** provides population statistics for counties and municipalities. The most recent data is from the American Community Survey (ACS) 5-Year Estimates for 2023. Note that ACS all estimates are derived from statistical samples and include margins of error. Census counts are more accurate, although the 2020 Census was impacted by the Covid-19 Pandemic.

Over the past decade, the four counties and municipalities have experienced shifting population trends, with some communities growing steadily while others have seen notable declines.

Billings County has maintained a relatively stable population, experiencing only a slight increase. Dunn County, on the other hand, has faced a small decline in overall population, although certain towns, like Dodge and Dunn Center, have been substantially growing. Golden Valley County has also experienced an overall decrease. Stark County, the most populous in the region, has also been slightly declining.

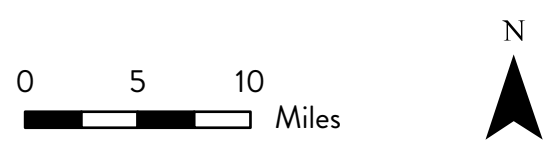
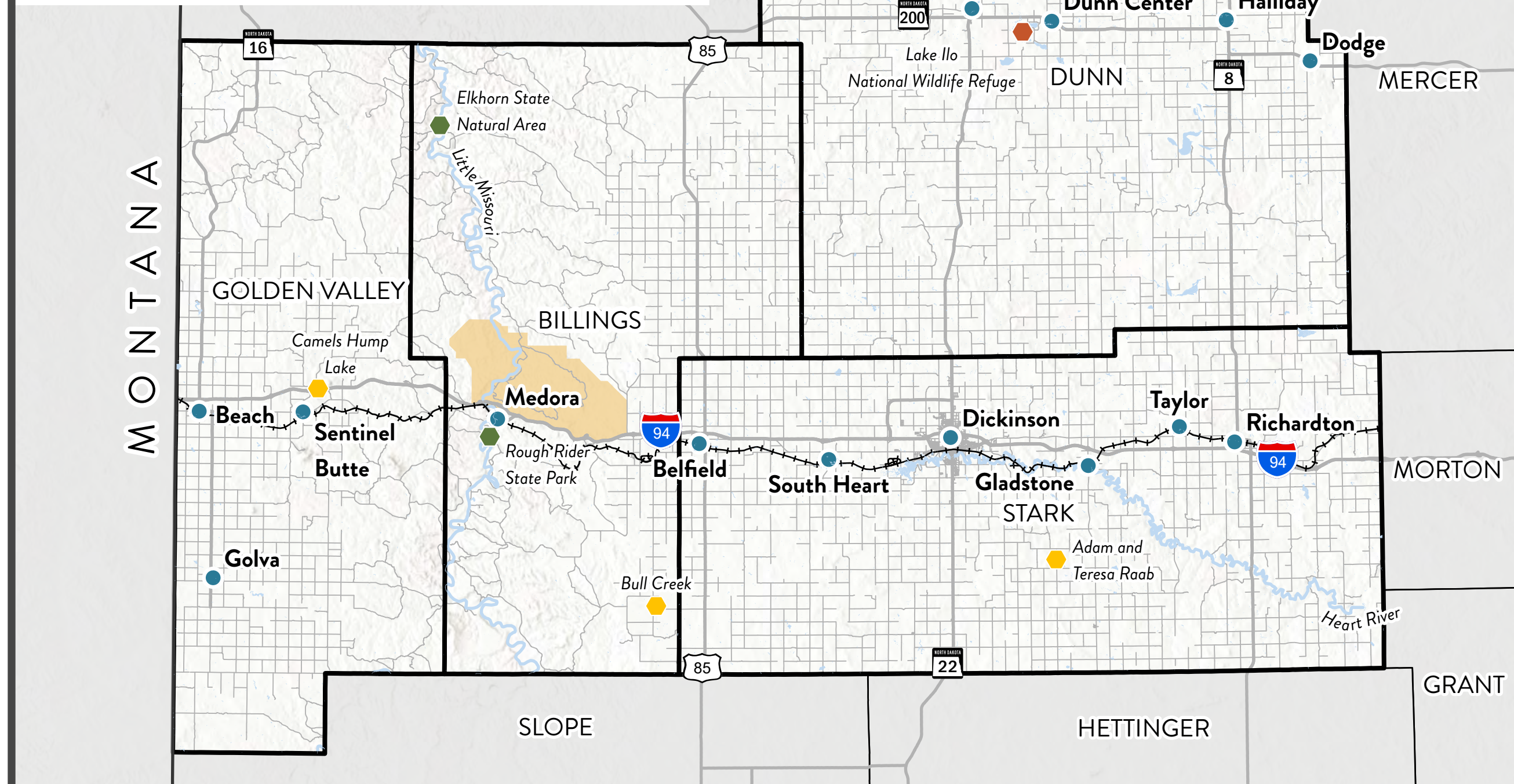
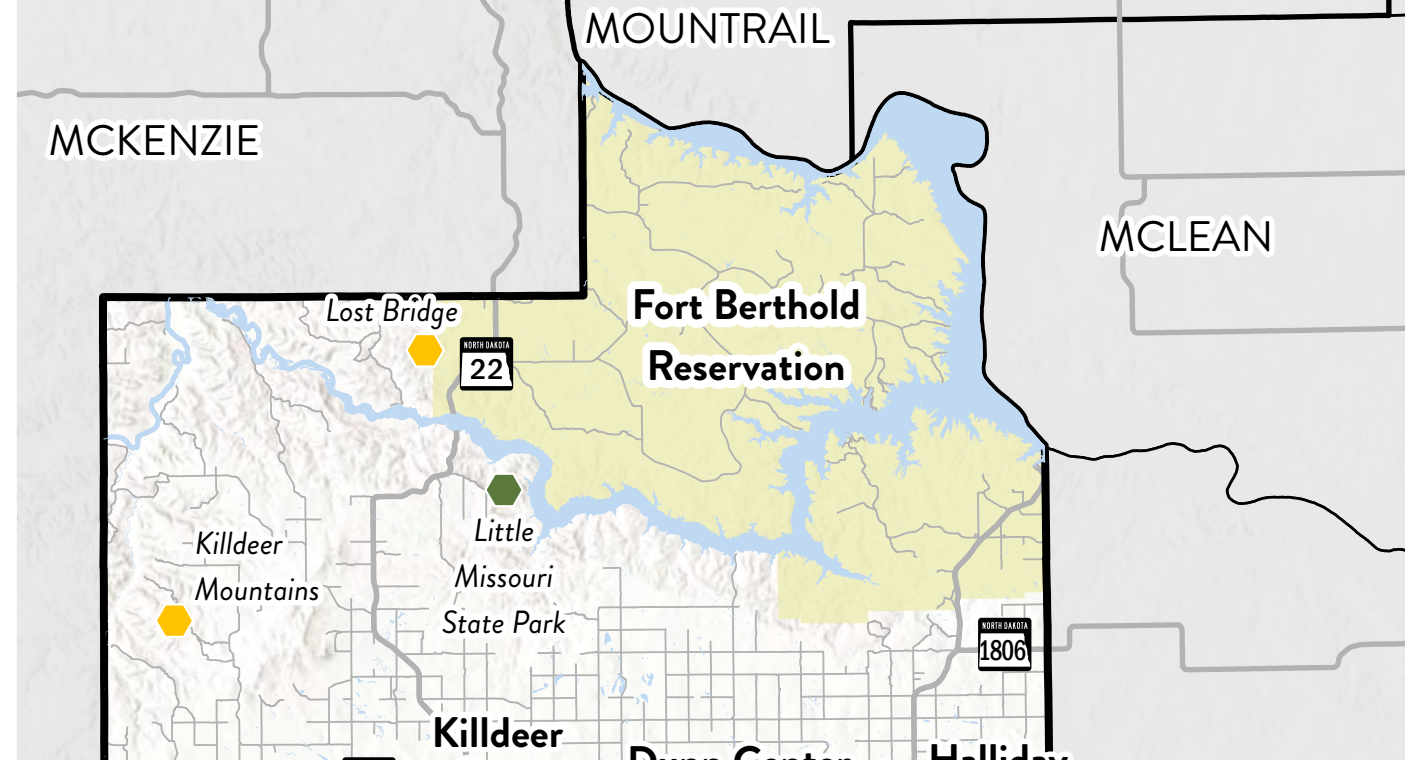
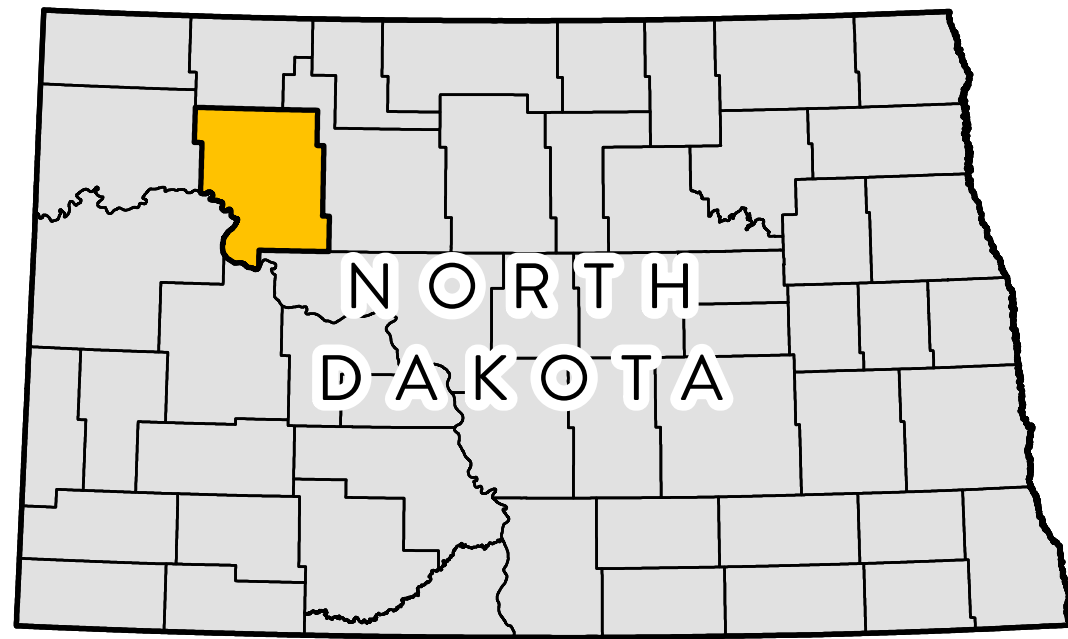
Age distribution in these counties consists of young families, working-age adults, and a significant number of older residents. Education levels across the region are generally high, with most residents having at least a high school diploma. Income levels are quite different across the region. Dunn County has a much higher median household income than the state average. Billings and Golden Valley counties have lower median incomes, and some communities face higher poverty levels. Household sizes also differ, with Dunn County having the largest average.

# 2025 Multi-Hazard Mitigation PLAN

Figure 1

## Study Area

-  Study Area Counties
-  City
-  Major Highway
-  Local Road
-  Railroad
-  National Park
-  Tribal Reservation
-  State Park
-  Wildlife Management Area
-  National Wildlife Refuge
-  Lake
-  Major River



**Table 3. Population Trends by Jurisdiction**

| Jurisdiction                | 2010          | 2020          | 2010- 2020 Change | 2023          | 2020-2023 Change |
|-----------------------------|---------------|---------------|-------------------|---------------|------------------|
| <b>Billings County</b>      | <b>783</b>    | <b>945</b>    | <b>20.7%</b>      | <b>948</b>    | <b>0.3%</b>      |
| Medora                      | 112           | 121           | 8.0%              | 150           | 24.0%            |
| Rural Billings County       | 671           | 824           | 12.7%             | 798           | (23.7%)          |
| <b>Dunn County</b>          | <b>3,536</b>  | <b>4,095</b>  | <b>15.8%</b>      | <b>4,043</b>  | <b>(1.3%)</b>    |
| Dodge                       | 87            | 89            | 2.3%              | 108           | 21.4%            |
| Dunn Center                 | 146           | 227           | 55.5%             | 366           | 61.2%            |
| Halliday                    | 188           | 241           | 28.2%             | 396           | 64.3%            |
| Killdeer                    | 751           | 939           | 25.0%             | 879           | (6.4%)           |
| Rural Dunn County           | 2,364         | 2599          | 9.9%              | 2,264         | (11.7%)          |
| <b>Golden Valley County</b> | <b>1,680</b>  | <b>1,736</b>  | <b>3.3%</b>       | <b>1,679</b>  | <b>(3.28%)</b>   |
| Beach                       | 1,019         | 981           | (3.7%)            | 933           | (4.9%)           |
| Golva                       | 52            | 84            | 61.5%             | 98            | 16.7%            |
| Sentinel Butte              | 56            | 61            | 8.9%              | 61            | 0.0%             |
| Rural Golden Valley County  | 553           | 610           | 10.3%             | 587           | (3.8%)           |
| <b>Stark County</b>         | <b>24,199</b> | <b>33,646</b> | <b>39.0%</b>      | <b>33,116</b> | <b>(1.6%)</b>    |
| Belfield                    | 800           | 996           | 24.5%             | 618           | (38.0%)          |
| Dickinson                   | 17,787        | 25,679        | 44.4%             | 25,216        | (1.8%)           |
| Gladstone                   | 239           | 271           | 13.4%             | 240           | (11.4%)          |
| Richardton                  | 529           | 692           | 30.8%             | 761           | 10.0%            |
| South Heart                 | 301           | 394           | 30.9%             | 556           | 41.1%            |
| Taylor                      | 148           | 230           | 55.4%             | 193           | (16.1%)          |
| Rural Stark County          | 4,395         | 5,384         | 22.5              | 5,532         | (2.7%)           |

Source: US Census Bureau: 2020 Decennial Census and 2023 American Community Survey

## Statewide Trends

**Young Children (5 and Under).** Growth is expected to slow after 2030 due to lower fertility rates and women having children at an older age.

**All Children (18 and Under).** Significant growth is expected through 2030, with the growth rate slowing through 2040.

**Workforce Age Group.** Continued growth is expected through 2050 in both the 18 to 34 demographic and the 35 to 64 demographic.

**Residents Aged 65+.** Significant growth is expected through 2035, with a slight decline through 2045, and another growth cycle, driven by the large number of individuals in the baby boom generation.

## POPULATION PROJECTIONS



The State Data Center at the North Dakota Department of Commerce provides population projections for North Dakota’s regions and Counties. The most recent data were released in February 2024 and include projections through the year 2050. The methodology is a modified version of the cohort survival component model, the most commonly used method of population forecasting. This method incorporates birth rates, mortality rates, and migration rates for different age groups. The Dickinson region, which includes Billings, Dunn, Golden Valley, and Stark Counties, is forecasted to reach a population of approximately 70,000 by the year 2050. Regional growth will continue to be driven by the Dickinson-area economy, with Stark County’s population forecasted to grow by over 50 percent by 2050. **Table 4** provides projections for each county.

**Table 4. County Population Projections**

| County        | 2025 Projection | 2030 Projection | 2040 Projection | 2050 Projection | 25-year Change | Percent Change |
|---------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|
| Billings      | 975             | 1,028           | 1,097           | 1,229           | 254            | 26.1%          |
| Dunn          | 4,165           | 4,444           | 5,107           | 5,976           | 1,811          | 43.5%          |
| Golden Valley | 1,708           | 1,705           | 1,700           | 1,720           | 12             | 0.7%           |
| Stark         | 34,646          | 37,856          | 44,270          | 52,510          | 17,864         | 51.6%          |

Source: 2024 North Dakota State Data Center Population Projections of the State, Regions, and Counties

# DEMOGRAPHICS



**Table 5** provides demographic characteristics for each county, which vary across the study area. The median age ranges from 34.1 years in Stark County to 44.0 years in Billings County, compared to the statewide average of 35.8 years. The All counties are majority-white. However, the non-white population varies from 20.0 percent in Dunn County to 3.6 percent in Billings County, compared to 17.1 percent for the state. Dunn County overlaps with a portion of Fort Berthold Reservation, which is home to the Three Affiliated Tribes (Mandan, Hidatsa, and Arikara Nation).

The median household income for all counties is higher than the statewide average median. However, many families' incomes are below the poverty threshold.

# VULNERABLE POPULATIONS

Certain demographics are more vulnerable to hazards. For example, older residents are more likely to have ambulatory disabilities or cognitive difficulties that increase their risk to hazards. They may also have difficulty receiving communications from county agencies. Similarly, residents who are not native English speakers may have difficulty communicating during emergencies. Nearly eight percent of households in Stark County speak a language other than English at home.

**Table 5. Demographic Statistics**

| Demographic               | Billings County | Dunn County  | Golden Valley County | Stark County  | North Dakota    |
|---------------------------|-----------------|--------------|----------------------|---------------|-----------------|
| <b>Population</b>         | <b>945</b>      | <b>4,095</b> | <b>1,736</b>         | <b>33,646</b> | <b>779,094</b>  |
| <b>AGE DEMOGRAPHICS</b>   |                 |              |                      |               |                 |
| Persons under 5 years     | 70 (7.4%)       | 308 (7.5%)   | 120 (6.9%)           | 2,684 (8.0%)  | 52,366 (6.7%)   |
| Persons 5 to 19 years     | 150 (15.8%)     | 815 (20%)    | 378 (21.8%)          | 6,831 (20.3%) | 153,779 (19.8%) |
| Persons 20 to 34 years    | 154 (16.2%)     | 718 (17.5%)  | 205 (11.8%)          | 7,791 (23.1%) | 173,799 (22.3%) |
| Persons 35 to 49 years    | 148 (15.7%)     | 716 (17.5%)  | 303 (17.4%)          | 6,139 (18.2%) | 137,922 (17.7%) |
| Persons 50 to 64 years    | 234 (24.8%)     | 842 (20.5%)  | 334 (19.2%)          | 5,795 (17.3%) | 137,808 (17.6%) |
| Persons 65 years and over | 189 (20.0%)     | 696 (17.0%)  | 396 (22.8%)          | 4,406 (13.1%) | 65,768 (17.3%)  |
| Median Age                | 44.0            | 38.8         | 42.1                 | 34.1          | 35.8            |

| Demographic                                   | Billings County | Dunn County   | Golden Valley County | Stark County   | North Dakota    |
|---|-----------------|---------------|----------------------|----------------|-----------------|
| <b>RACE/ETHNICITY</b>                         |                 |               |                      |                |                 |
| White   | 911 (96.4%)     | 3,277 (80.0%) | 1,620 (93.3%)        | 28,924 (86.0%) | 645,938 (82.9%) |
| Hispanic or Latino                            | 22 (2.3%)       | 107 (2.6%)    | 48 (2.8%)            | 2,274 (6.8%)   | 33,412 (4.3%)   |
| American Indian or Alaska Native              | 5 (0.1%)        | 457 (11.2%)   | 12 (0.1%)            | 469 (1.4%)     | 38,914 (5.0%)   |
| Black or African American                     | 4 (0.4%)        | 25 (0.6%)     | 5 (0.3%)             | 1,050 (3.1%)   | 26,783 (3.4%)   |
| Asian   | 6 (0.6%)        | 33 (0.8%)     | 1 (0.1%)             | 356 (1.1%)     | 13,213 (1.7%)   |
| Two or More Races                             | 19 (2%)         | 263 (6.4%)    | 91 (5.2%)            | 1,863 (5.5%)   | 41,940 (5.4%)   |
| Native Hawaiian and Pacific Islander          | 0 (0.0%)        | 0 (0.0%)      | 1 (0.1%)             | 56 (0.2%)      | 924 (0.1%)      |
| Other Race                                    | 0 (0.0%)        | 40 (1.0%)     | 6 (0.3%)             | 928 (2.8%)     | 11,382 (1.5%)   |
| <b>HOUSEHOLD AND ECONOMIC CHARACTERISTICS</b> |                 |               |                      |                |                 |
| High School graduate or higher, age 25+       | 668 (95.3%)     | 5,252 (92.6%) | 2,354 (97.0%)        | 38,950 (91.0%) | 491,589 (94.5%) |
| Median household income                       | \$81,250        | \$94,688      | \$76,528             | \$80,744       | \$76,525        |
| Families below poverty level                  | 12.4%           | 3.1%          | 9.2%                 | 6.8%           | 5.6%            |
| Language other than English spoken at home    | 19 (2.1%)       | 372 (10.1%)   | 20 (1.3%)            | 2,371 (7.8%)   | 45,934 (6.2%)   |
| <b>DIFFERENTLY-ABLED POPULATIONS</b>          |                 |               |                      |                |                 |
| Population with an ambulatory disability      | 47 (5.3%)       | 200 (5.5%)    | 229 (14.7%)          | 1,385 (4.6%)   | 38,460 (5.4%)   |
| Population with a cognitive difficulty        | 31 (3.5%)       | 171 (4.7%)    | 146 (9.4%)           | 1,642 (5.5%)   | 38,343 (5.3%)   |

Source: US Census Bureau and 2023 American Community Survey

## Economic Characteristics



The regional economy is driven by the agriculture and energy development, with manufacturing and tourism/hospitality also playing significant roles. Agriculture is closely monitored through annual surveys conducted by the National Agricultural Statistics Service and the Census of Agriculture.

Key employers in the region reflect its diverse economic base. In Billings County, major employers include the areas of tourism, education, and public administration. Dunn County's economy is strongly influenced by the energy sector, alongside education and public administration. Golden Valley County's largest employers also include education and public administration. Stark County has major employers in education, retail, healthcare, and manufacturing.

## AGRICULTURAL PRODUCTION

The Census of Agriculture updates county statistics for farming and ranching every five years. Wheat for grain is the most common crop, taking up over 40 percent of all harvested acreage in the study area.

Cattle, corn, and hay are other major agricultural commodities. In 2022, the total market value of all agricultural products sold in the study area was approximately \$410 million. The estimated value of farmland, including land and buildings, ranges from \$1,167 per acre in Billings County to \$1,651 per acre in Stark County. **Table 6** provides agricultural statistics for each county and regional totals.



*Farming and ranching drive the regional economy. (The Dickinson Press)*

**Table 6. County Agricultural Statistics**

| Metric  | Billings         | Dunn           | Golden Valley | Stark            | Total      |
|---|------------------|----------------|---------------|------------------|------------|
| Number of farms                                       | 120              | 380            | 179           | <b>434</b>       | 1,113      |
| Harvested acres                                       | 86,739           | 293,595        | 152,149       | <b>415,284</b>   | 947,767    |
| Wheat for Grain (acres)                               | 25,899           | 103,724        | 58,320        | <b>195,329</b>   | 383,272    |
| Wheat for Grain (bushels)                             | 1,012,733        | 4,488,232      | 1,900,704     | <b>8,842,488</b> | 16,244,157 |
| Corn for Grain (acres)                                | 3,638            | 14,545         | 10,069        | <b>40,844</b>    | 69,096     |
| Corn for Grain (bushels)                              | 224,943          | 1,177,907      | 613,468       | <b>2,821,857</b> | 4,838,175  |
| Barley for Grain (acres)                              | 2,509            | <b>5,604</b>   | NA            | 4,777            | NA         |
| Barley for Grain (bushels)                            | 144,225          | 279,899        | NA            | <b>247,351</b>   | NA         |
| Soybeans (acres)                                      | 0                | 2,223          | 0             | <b>7,335</b>     | 9,558      |
| Soybeans (bushels)                                    | 0                | 30,270         | 0             | 181,712          | 211,982    |
| Hay, haylage, silage (acres)                          | 47,795           | <b>125,000</b> | 60,709        | 85,677           | 319,181    |
| Hay, haylage, silage (dry tons)                       | 65,863           | <b>219,710</b> | 67,545        | 135,702          | 488,820    |
| Cattle and Calves Number                              | 25,096           | <b>73,982</b>  | 30,785        | 37,782           | 167,645    |
| Cattle and Calves Farms                               | 125              | <b>301</b>     | 116           | 294              | 836        |
| Sheep and Lambs Number                                | 0                | 569            | 1,109         | <b>3,473</b>     | 5151       |
| Sheep and Lambs Farms                                 | 0                | 11             | 15            | <b>22</b>        | 48         |
| Est. market value of land and buildings (per acre)    | \$1,167          | \$1,516        | \$1,242       | <b>\$1,651</b>   | NA         |
| Market value of agricultural products sold (total)    | \$56.85M         | \$127.56M      | \$55.55M      | <b>\$169.98M</b> | \$409.94M  |
| Market value of agricultural products sold (per farm) | <b>\$334,413</b> | \$255,111      | \$223,071     | \$276,367        | NA         |

Source: 2022 Census of Agriculture, North Dakota State and County Data. The four-county maximum values are shown in **bold text**.

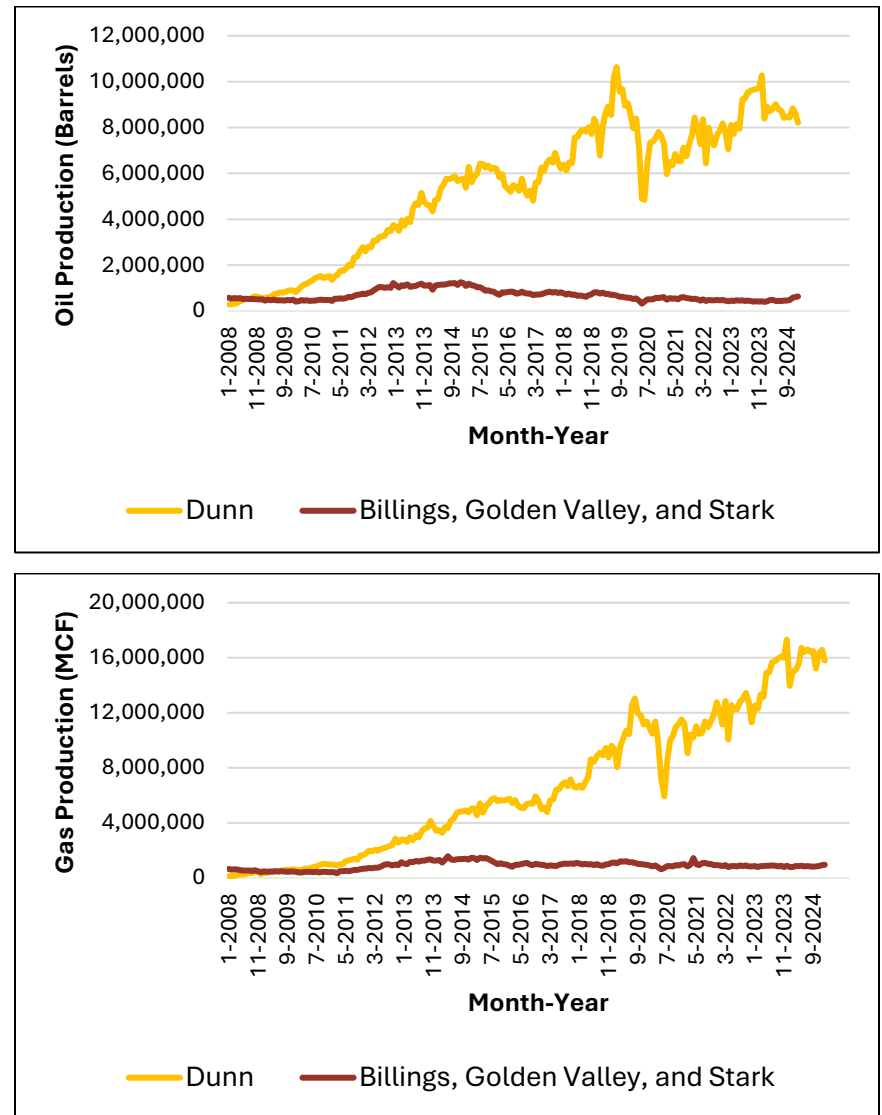
## ENERGY PRODUCTION

Billings, Dunn, Golden Valley, and Stark Counties comprise four of the 19 oil- and gas-producing counties in North Dakota. Dunn County is one of the state’s largest energy producers, along with McKenzie, Mountrail, and Williams Counties. In 2024, Dunn County produced approximately 19 times as much oil and gas as Billings, Golden, Valley, and Stark Counties combined. **Figure 2** charts historical oil and natural gas production for the region beginning in 2008, which was roughly the beginning of the last energy boom in western North Dakota. Regional oil production has returned to pre-pandemic levels, while regional gas production is approximately 50 percent higher than before the COVID-19 pandemic. **Figure 3** depicts well density, hazardous pipelines, and natural gas processing plants in the region. These facilities present a risk of hazardous materials release.



The Bear Creek natural gas processing plant in Dunn County. **Image Credit: The Dickinson Press**

**Figure 2. Historical Oil and Natural Gas Production**



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










# 2025 Multi-Hazard Mitigation PLAN



Figure 3

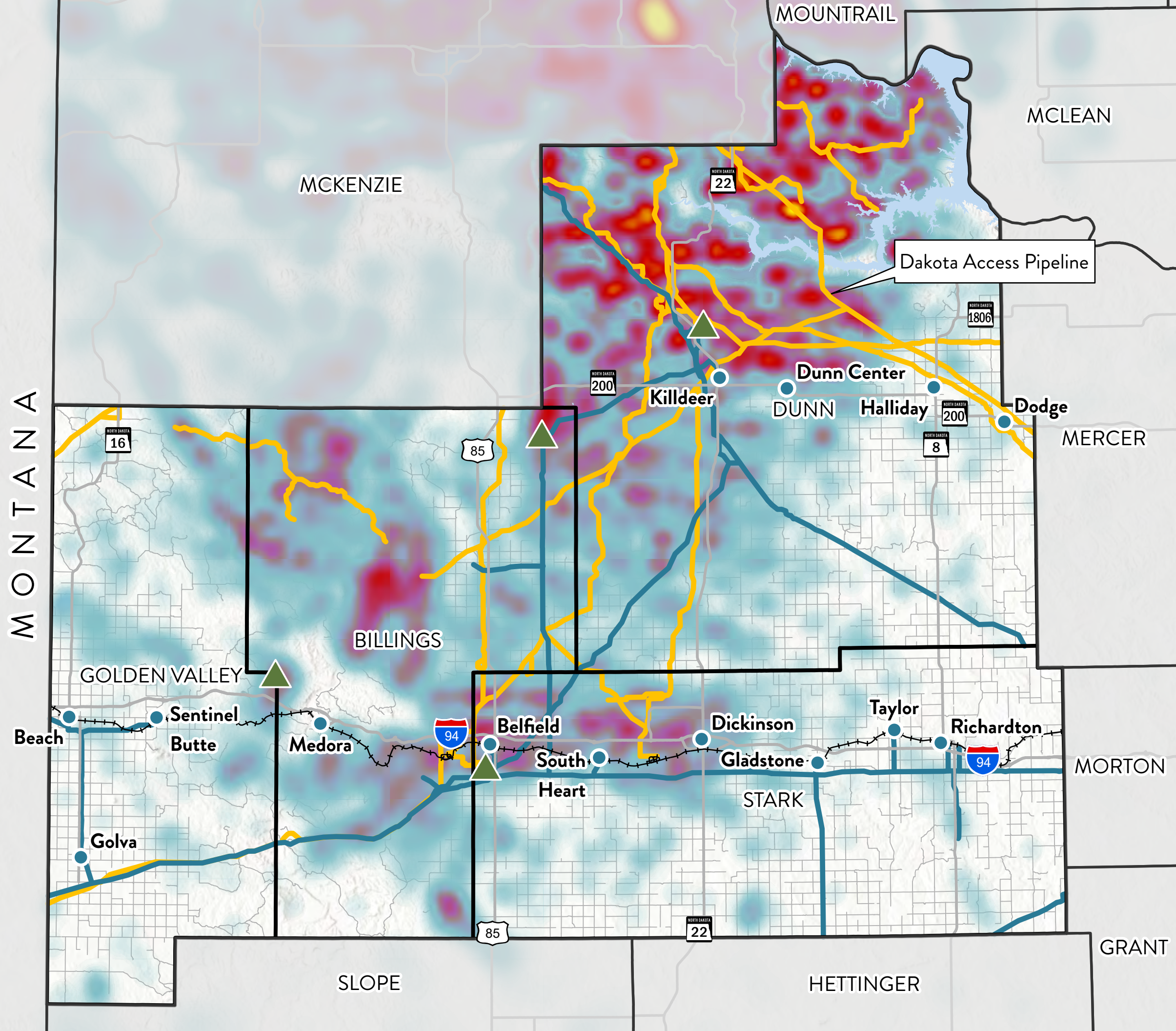
## Oil and Gas Development

### Wells

-  Sparse
-  Dense
-  Gas Pipeline
-  Oil Pipeline
-  Natural Gas Plant
-  County Boundary
-  Railroad
-  Major Highway
-  City

Source: North Dakota Department of Mineral Resources; National Pipeline Mapping System

0 5 10  
Miles



# County Development Trends & Vulnerability Impacts

## BILLINGS COUNTY

Billings County remains one of the least populated counties in North Dakota with fewer than 1,000 year-round residents, yet the Medora area is undergoing significant development driven largely by the upcoming Theodore Roosevelt Presidential Library (TRPL). These changes have altered the County's hazard exposure profile during the current planning period. The assessment below outlines whether development has increased or decreased vulnerability for Billings County and its participating jurisdictions, with relevance only to FEMA-relevant natural hazards such as drought, flood, severe weather, geologic hazards, wildfire, and dam failure.

### Billings County (Overall)

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire, Severe Summer/Winter Weather, Geologic Hazard

Increased development within Medora has produced both resilience gains and elevated risk across Billings County. Rural areas face increased wildfire exposure tied to low-occupancy housing and delayed detection, representing a continuing area of concern moving forward.

### City of Medora

**Development Impact:** Both Increasing and Decreasing

**Relevant Hazards:** Wildfire, Drought, Severe Summer/Winter Weather

Improvements to Medora's water infrastructure have strengthened drought and wildfire readiness, but increased visitation and continued tourism expansion increase vulnerabilities. The new TRPL sits atop a bluff with only one current vehicular access route crossing a BNSF rail line. A roadway blockage caused by severe weather, slope failure, or fire could isolate the bluff, restricting evacuation or emergency response. Planned development of a secondary full-service access route reduces this vulnerability. In the meantime, the community is planning to improve an existing trail alignment to emergency access to the bluff.

The recently completed roundabout at Pacific Avenue and Chateau Road improves mobility in the event of an evacuation, but the railroad crossing remains a challenge.

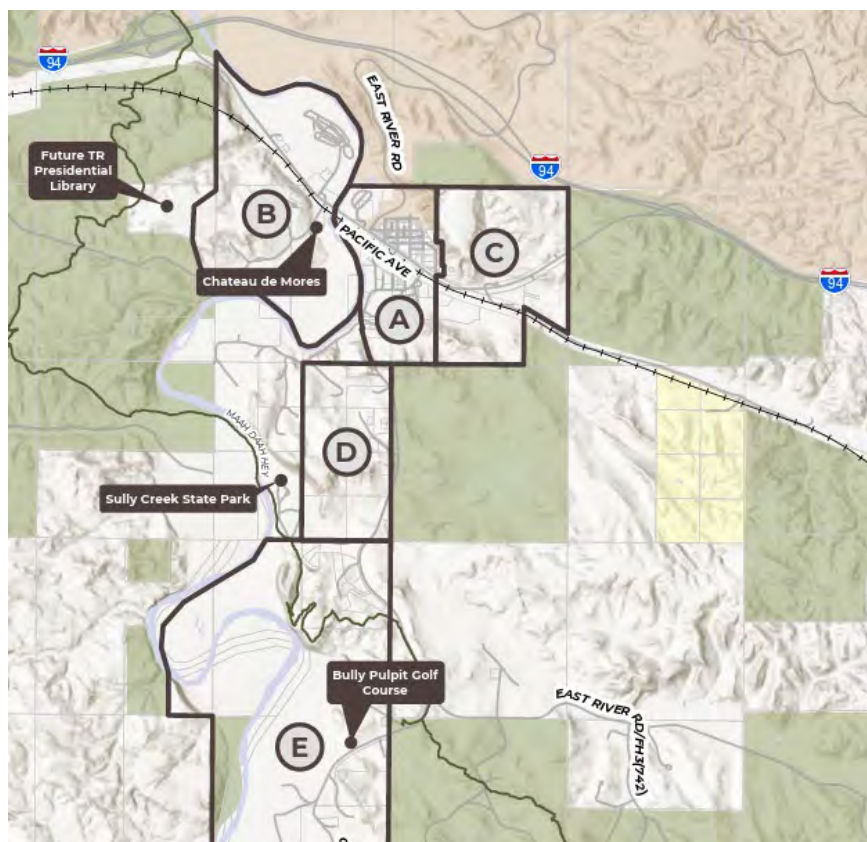
Recent developments, including a new hotel west of the Little Missouri River and a new event barn south of Medora, will also place strain on the city's services and emergency response to hazards. Even with these vulnerabilities, however, there is also decreased vulnerability to hazards in the form of a development agreement which has been established for the hotel project. This development agreement has added capacity to the City's existing water storage tank and will finance an additional 50,000-gallon storage tank which will improve the community's resilience to drought and urban/wildland fire.

### Unincorporated Areas

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire

Residential growth is minimal but characterized by seasonal and remote dwellings, contributing to increased fire risk where ignition events may go unnoticed. Visitor expansion in rural recreational spaces may also elevate this risk during dry or high-wind periods.



*Medora has opportunities for infill development and expansion, primarily west of town (Area B), with additional amenities focused near the golf course (Area E).*

## DUNN COUNTY

Growth in Dunn County has been fueled by the oil and gas industry and related development. Natural gas production, in particular, continues to increase and buoy the overall economy. Oil and gas activity occurs throughout the county, while larger industrial, commercial, and residential development is concentrated in Killdeer.

Several drill sites have been developed or expanded around Killdeer in the past five years. Recent development includes:

- The DOE site in the southeast quadrant of the Highway 22/Highway 200 intersection (2024)
- The Roadrunner 1 site and Clover site northwest of Killdeer (2024)
- The North Prairie Addition, which includes 23 developable residential lots (2023)
- The BA Addition, which includes 23 developable single-family lots (2023)

This growth has generally increased vulnerability by placing more assets and population in areas exposed to wildfire, severe weather, and drought stress. While industrial regulation by the NDIC helps reduce conflicts between new and existing development, continued planning and hazard-aware land use guidance will be necessary to ensure long-term resilience across both incorporated and unincorporated areas.

### Dunn County (Overall)

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire, Severe Weather, Geologic Hazard, Drought

Widespread oil and gas activity has expanded the number of industrial infrastructure sites potentially exposed to wildfire or severe storm damage while their oftentimes remote location means these sites may face delayed response times during weather-related access disruptions. Increased workforce population places greater stress on water availability and drought response capacity if growth continues without corresponding infrastructure improvements.

## City of Killdeer

**Development Impact:** Increasing

**Relevant Hazards:** Severe Summer/Winter Weather, Wildfire, Flood

The largest concentration of industrial, commercial, and residential growth in the County is occurring in Killdeer, including the DOE site in the southeast quadrant of the Highway 22/Highway 200 intersection, the Roadrunner 1 and Clover drill sites northwest of the community, and two residential additions totaling 46 new lots. These additional increases in development have increased both the population at risk during wildfire events, as well as the potential for ignition events. Growth-related surface disturbance and additional impervious areas may marginally elevate localized flood risk without careful stormwater planning.

## Unincorporated Areas of Dunn County

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire, Severe Weather, Flood, Drought

As previously mentioned, oil and gas expansion across rural areas increases the number of assets located in isolated environments where incident detection and response may be slower. Severe weather events such as blizzards, high winds, and flooding could disrupt these operations as well as impact road access to these rural areas, increasing vulnerability for workers and equipment. Additionally, population growth linked to the expansion of the oil and gas industry could strain rural water supply during extended drought periods, leading to competing interests between residential, agricultural, and industrial users.

## GOLDEN VALLEY COUNTY

Golden Valley County has experienced minimal population change in recent decades. After a modest increase from 1,680 residents in 2010 to 1,736 in 2020, long-term growth is expected to remain flat. Most future development is anticipated to occur in and around the City of Beach, where essential services, utilities, and transportation infrastructure are already concentrated. Because development is limited and localized, its influence on the County's exposure to FEMA-recognized natural hazards (drought, flood, severe summer and winter weather, geologic hazard, wildfire, and dam failure) is minor compared to other jurisdictions in the region.

## Golden Valley County (Overall)

**Development Impact:** Stable (Minimal Change)

**Relevant Hazards:** Wildfire, Severe Weather, Drought

Low population growth will limit the expansion of infrastructure or people into at-risk areas. Additionally, minimal development activity reduces the likelihood of exposure to hazards such as wildfire, flood, or geologic hazards. As such, county-wide vulnerability is expected to remain largely unchanged and driven more by regional weather and environmental conditions rather than development pressures.

## City of Beach

**Development Impact:** Slight Decrease or Stable (Minimal Change)

**Relevant Hazards:** Flood, Severe Weather, Wildfire

Because future development is expected to remain concentrated in Beach where emergency services and utilities already exist, the community benefits from stronger hazard mitigation capacity than other rural areas in the County. By concentrating growth in serviced areas, the city may be able to reduce vulnerability by avoiding the dispersal of new residences and businesses into remote areas with

limited access where they might be more prone to fire risks. Any new development within city limits will have minimal effect on hazard exposure and is unlikely to increase flood or severe weather vulnerability if existing standards are maintained.

## Unincorporated Areas of Golden Valley County

**Development Impact:** Stable (Minimal Change)

**Relevant Hazards:** Wildfire, Severe Weather, Drought

Due to minimal development activity the population levels of Golden Valley County are expected to remain largely stable. As a result, vulnerability to FEMA-recognized natural hazards will more than likely remain as it is now. Concentrated future growth in the City of Beach may offer slight resilience advantages by keeping development tied to stronger infrastructure and emergency services. Overall, development trends in the past plan period have had little to no measurable impact on hazard vulnerability across the County.

## STARK COUNTY

Stark County continues to experience steady population and economic growth, with the majority of new development occurring in and around the City of Dickinson. Development pressure is most concentrated on the western edge of Dickinson and extending toward South Heart. Both the Dickinson Direction 2050 Comprehensive Plan and the Stark County Comprehensive Plan project continued growth through 2030 across the County's incorporated and unincorporated areas. Industrial development also remains active, with some projects increasing exposure to natural hazard impacts, while others have reduced risk. The following assessment summarizes how these development trends have increased or decreased vulnerability to FEMA-recognized natural hazards including drought, flood, severe summer and winter weather, geologic hazard, wildfire, and dam failure.

## Stark County (Overall)

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire, Severe Weather, Flood, Drought

County-wide population and employment growth continue to increase overall exposure to natural hazards particularly severe storms and wildfire in expanding fringe areas. Industrial development over the past five years has expanded the number of sites with infrastructure vulnerable to storm damage or wildfire, although some facility conversions have reduced this risk as well. Additional demand for water resources may heighten the County's overall vulnerability during drought unless infrastructure capacity is expanded.

## City of Dickinson

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire, Severe Weather, Flood, Drought

The City of Dickinson is projected to grow to over 29,000 residents by 2030, adding approximately 1,800 residents to the community. This population growth will increase the number of people and structures exposed to severe weather, flooding, and wildfire conditions in expansion areas. Most new development is occurring on the western edge of the city where emergency access is more limited. The City is exploring siting a future fire station to improve response times which may reduce vulnerability once implemented. Concentrated growth areas may also increase stormwater runoff and localized flood risk if not paired with adequate drainage improvements. As with other communities in the study area, higher population density increases demand for water during drought conditions and may lead to competing interests between residential, agricultural, and industrial users.

## City of South Heart

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire, Severe Weather, Flood,

South Heart has seen notable population growth, rising from 301 residents in 2010 to a current estimate of 556. This increased development / residential expansion has led to an increase in the number of households exposed to severe storms and other hazards. Proximity to Dickinson may reduce some vulnerability due to shared services and access to nearby emergency resources, but growth still introduces heightened exposure to hazard events.

## Other Incorporated Cities (Belfield, Gladstone, Richardton)

**Development Impact:** Slight Increase

**Relevant Hazards:** Wildfire, Severe Weather, Flood,

Modest county-wide growth projects suggest incremental increases in exposure across the remaining municipalities in Stark County. The industrial waste landfill expansion south of Belfield increases infrastructure exposure to severe storms and could elevate localized flood vulnerability depending on drainage characteristics. No anticipated major development trends indicate reduced vulnerability in these communities.

## Unincorporated Areas of Stark County

**Development Impact:** Increasing

**Relevant Hazards:** Wildfire, Severe Weather, Drought

About 1,000 new residents are expected to locate in rural and unincorporated portions of the County by 2030. This population growth will lead to an increase in the number of households in areas with higher wildfire risk and potentially limited emergency access. Dispersed rural developments could experience delays in emergency

response times during severe winter weather or flooding events. Meanwhile, industrial activity in unincorporated areas will increase infrastructure exposure to hazards, although the recent conversion of the Marathon Petroleum facility south of Dickinson to renewable diesel has reduced hazardous materials risk at that site.

## Critical Facilities

Critical facilities play a vital role in disaster response, recovery, and continuity of essential services within Billings, Dunn, Golden Valley, and Stark Counties. These facilities include hospitals, emergency operations centers, police and fire stations, utilities, schools, and other key infrastructure essential to public safety and economic stability. An important element of hazard mitigation planning is determining critical facilities that may need special consideration during the preparation of mitigation action items.

## EMERGENCY FACILITIES

These facilities are crucial to the health and welfare of the entire population and become especially important following hazard events. Examples include:

- Hospitals and medical centers.
- Emergency operations centers.
- Fire and police stations.
- Shelters and mass care facilities.

**Figure 4** and **Figure 5** on the following pages depict service areas for fire departments and emergency responders.

## UTILITY AND INFRASTRUCTURE SYSTEMS

The disruption of these systems would have significant impacts on the population and emergency response. Examples include:

- Water treatment and wastewater facilities.
- Power generation and distribution networks.
- Communication infrastructure.
- Transportation infrastructure.

- Facilities containing high-density or vulnerable populations.

## INSTITUTIONAL FACILITIES

These facilities require special consideration due to the large number of occupants or the presence of at-risk individuals. Examples include:

- Schools, daycare centers, and universities.
- Retirement homes and assisted living facilities.
- Correctional institutions.

## HISTORIC & CULTURAL SITES

These locations hold significant community values and are important for community development. Examples include:

- Historic landmarks and cultural heritage sites.
- Museums and community centers.

## RECREATION AREAS

Park-goers and trail user can be vulnerable to severe summer weather (e.g., tornado) if they become stranded without access to shelter.

Major recreation areas in the four-county area include:

- Theodore Roosevelt National Park (Billings County)
- Sully Creek State Park (Billings County)
- Little Missouri State Park (Dunn County)
- Lake Ilo National Wildlife Refuge (Dunn County)
- Camels Hump Lake Recreation Area (Golden Valley County)
- Patterson Lake Recreation Area (Stark County)
- Schnell Recreation Area (Stark County)

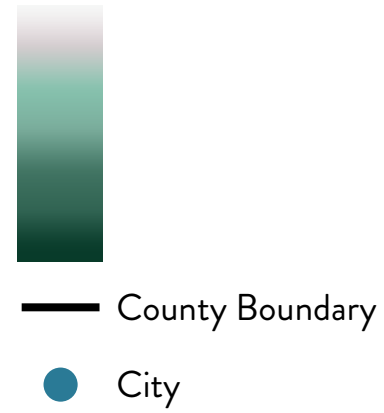
**Table 7** identifies many critical facilities in the study area. This list is not exhaustive.

# 2025 Multi-Hazard Mitigation PLAN

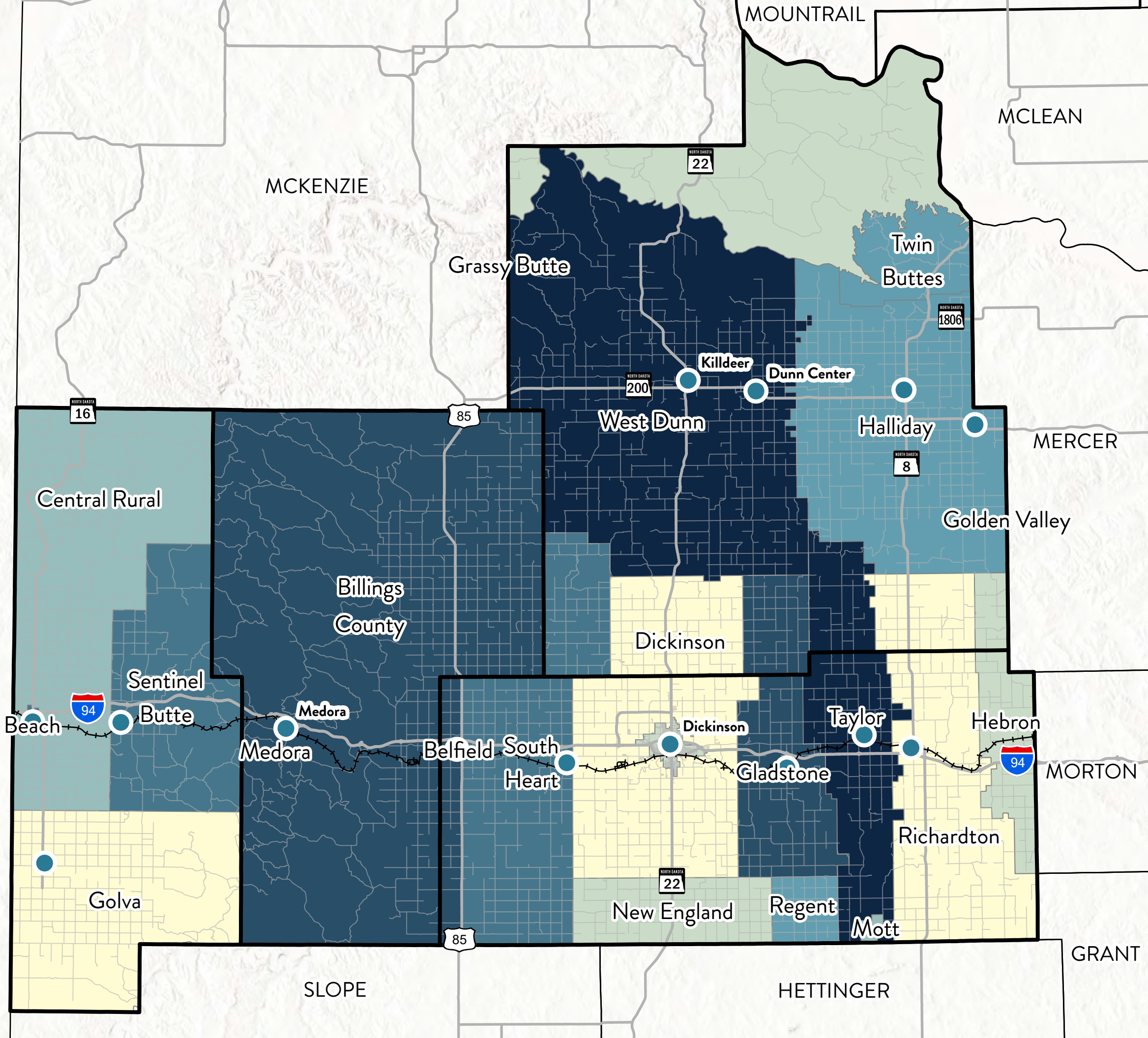
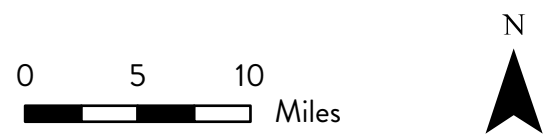
Figure 4

## Fire Districts

Fire Districts



Source: North Dakota GIS Hub



# 2025 Multi-Hazard Mitigation PLAN

Figure 5

## EMS Response Districts

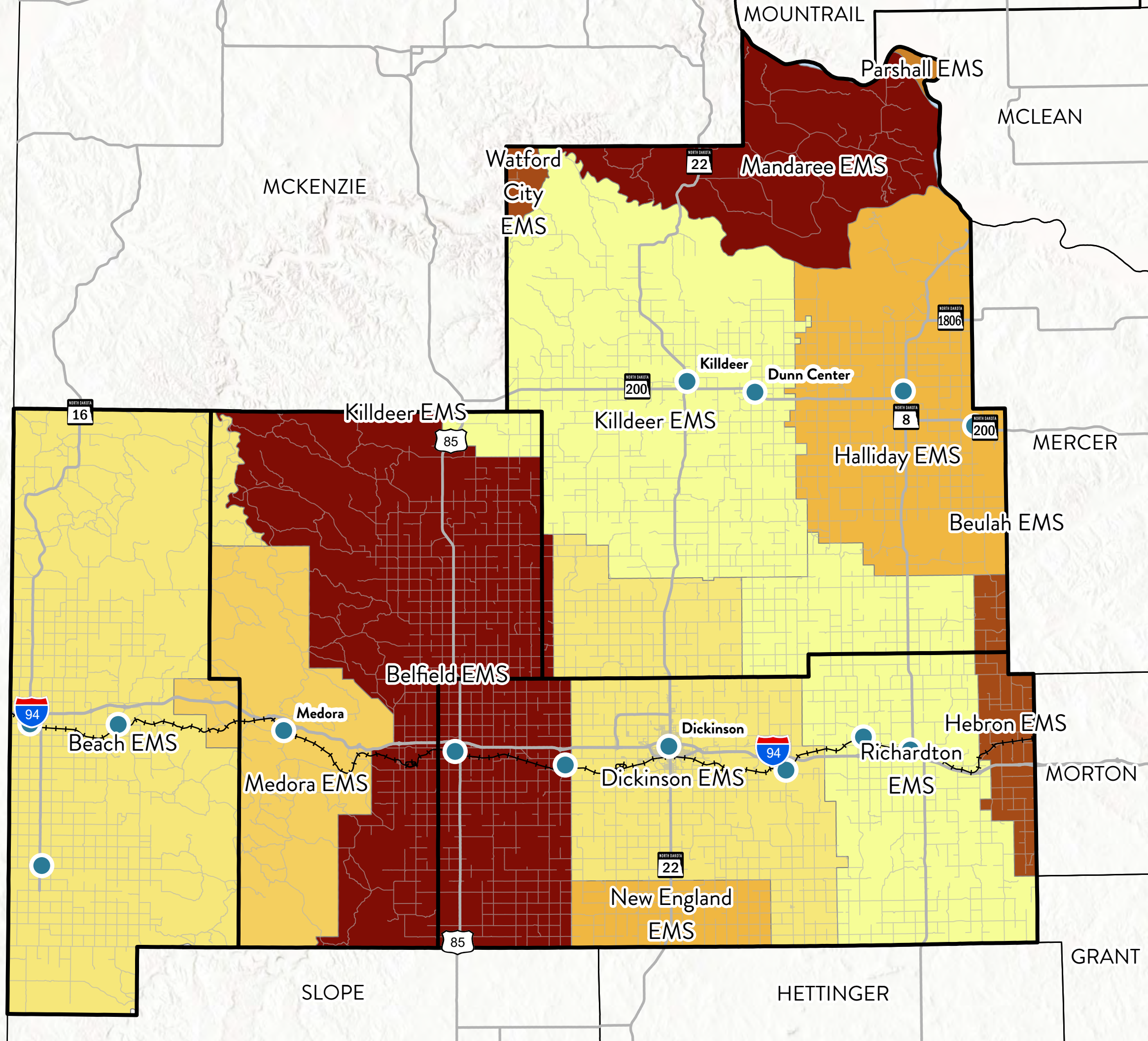
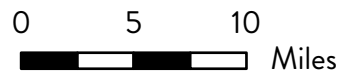
EMS Response Districts



County Boundary

City

Source: North Dakota GIS Hub



**Table 7. Critical Facilities Inventory**

| Facility  | County        | Address  |
|---|---------------|--|
| <b>COMMUNITY CENTERS</b>                                |               |  |
| Medora Community Center                                 | Billings      | 465 Pacific Ave, Medora  |
| High Plains Community Center                            | Dunn          | 100 5 <sup>th</sup> Ave SW, Killdeer                             |
| Beach Community Center                                  | Golden Valley | 153 E Main St, Beach (City Hall)                                 |
| CountryHouse Memory Care                                | Stark         | 628 24 <sup>th</sup> St W, Dickinson                             |
| West River Community Center                             | Stark         | 2004 Fairway St, Dickinson                                       |
| <b>ELDERLY CARE FACILITIES</b>                          |               |  |
| Hill Top Home of Comfort                                | Dunn          | 95 Hill Top Dr, Killdeer   |
| Golden Valley Manor                                     | Golden Valley | 260 5 <sup>th</sup> St SW, Beach                                 |
| Benedict Court  | Stark         | 830 2 <sup>nd</sup> Ave E, Dickinson                             |
| Hawk's Point  | Stark         | 1266 Signal Butte, Dickinson                                     |
| Park Avenue Villa                                       | Stark         | 1050 Park Ave, Dickinson   |
| Richardton Health Center                                | Stark         | 8885 Highway 10, Richardton                                      |
| St. Luke's Home   | Stark         | 242 10 <sup>th</sup> St W, Dickinson                             |
| <b>EMERGENCY OPERATIONS CENTERS</b>                     |               |  |
| Billings County Emergency Management                    | Billings      | 495 4 <sup>th</sup> St, Medora (Billings County Courthouse)      |
| Dunn County Emergency Management                        | Dunn          | 308 Wilcox St, Manning   |
| Golden Valley Emergency Management                      | Golden Valley | 150 1 <sup>st</sup> Ave, Beach (Golden Valley County Courthouse) |
| Stark County Emergency Management                       | Stark         | 66 W Museum Dr, Dickinson (Stark County Sheriff's Office)        |
| <b>FIRE PROTECTION &amp; EMERGENCY MEDICAL SERVICES</b> |               |  |
| Billings Rural Fire                                     | Billings      | 604 E River Rd S, Medora   |
| District 2 Fairfield Fire Hall                          | Billings      | 12823 20 <sup>th</sup> St SW, Fairfield                          |

| Facility                                   | County        | Address   |
|--|---------------|---|
| Medora Fire Hall                           | Billings      | I-94 Loop W, Medora   |
| Medora EMS                                 | Billings      | 495 4 <sup>th</sup> St, Medora (Billings County Courthouse)         |
| Halliday Fire Department                   | Dunn          | PO Box 407, Halliday  |
| Killdeer Ambulance                         | Dunn          | 25 High St, Killdeer  |
| Killdeer Fire Hall                         | Dunn          | 215 4 <sup>th</sup> Ave W, Killdeer                                 |
| West Dunn Fire Hall                        | Dunn          | 220 Central Ave S, Dunn Center                                      |
| Beach Fire Department                      | Golden Valley | 150 1 <sup>st</sup> Ave SE, Beach (Golden Valley County Courthouse) |
| Golva Fire Department                      | Golden Valley | 1210 1 <sup>st</sup> Ave W, Golva                                   |
| Sentinel Butte Fire Department             | Golden Valley | 61 Front St, Sentinel Butte   |
| Dickinson Fire Department Station 1        | Stark         | 25 2 <sup>nd</sup> Ave W, Dickinson                                 |
| Dickinson Fire Department Station 2        | Stark         | 2475 State Ave N, Dickinson   |
| Dickinson Rural Fire Department            | Stark         | 706 S Main Ave, Dickinson   |
| Dickinson Rural North Station              | Stark         | 2489 3 <sup>rd</sup> Avenue W, Dickinson                            |
| Belfield Fire Department                   | Stark         | 100 3 <sup>rd</sup> Ave SW, Belfield                                |
| Gladstone Fire Department                  | Stark         | 498 Lee Ave N, Gladstone  |
| Richardton Rural Fire                      | Stark         | 115 2 <sup>nd</sup> St N, Richardton                                |
| Richardton Taylor Rural Ambulance District | Stark         | 125 N Ave W #101, Richardton  |
| South Heart Fire District                  | Stark         | 403 Roland Ave NW, South Heart                                      |
| Taylor Rural Fire Department               | Stark         | 3440 92 <sup>nd</sup> Ave SW, Taylor                                |
| <b>HEALTH &amp; MEDICAL FACILITIES</b>     |               |   |
| Killdeer Medical Clinic                    | Dunn          | 220 4th Ave SW, Killdeer  |
| CHI St. Alexius Family Clinic              | Golden Valley | 95 2 <sup>nd</sup> St NW, Beach                                     |
| Golden Valley Public Health Department     | Golden Valley | 150 1 <sup>st</sup> Ave SE, Beach (Golden Valley County Courthouse) |

| Facility                                | County   | Address   |
|---|----------|---|
| CHI St. Alexius Health                  | Stark    | 2500 Fairway St, Dickinson                                  |
| Sanford East Clinic                     | Stark    | 33 9 <sup>th</sup> St West, Dickinson                       |
| Sanford West Clinic                     | Stark    | 2615 Fairway St, Dickinson                                  |
| Southwestern District Health Unit       | Stark    | 528 21 <sup>st</sup> St W, Dickinson                        |
| <b>HISTORIC AND CULTURAL SITES</b>      |          |   |
| Burning Hills Amphitheater              | Billings | 3422 Chateau Rd, Medora                                     |
| Chateau De Mores                        | Billings | 3426 Chateau Rd, Medora                                     |
| De Mores Meat Packing Plant Ruins       | Billings | 201 East River Road, Medora                                 |
| Peaceful Valley Ranch                   | Billings | Theodore Roosevelt National Park                            |
| St Mary's Catholic Church               | Billings | 305 4 <sup>th</sup> St, Medora                              |
| Theodore Roosevelt Elkhorn Ranch        | Billings | Theodore Roosevelt National Park                            |
| Theodore Roosevelt Maltese Cross Ranch  | Billings | Theodore Roosevelt National Park                            |
| Theodore Roosevelt Presidential Library | Billings | 3410 Chateau Rd, Medora                                     |
| Von Hoffman House                       | Billings | 485 Broadway, Medora  |
| Killdeer Mountain Battlefield           | Dunn     | Killdeer Mountain Battlefield Road, Killdeer                |
| Lynch Knife River Flint Quarries        | Dunn     | 95 <sup>th</sup> Ave east of Dunn Center                    |
| Dickinson Area Public Library           | Stark    | 139 3 <sup>rd</sup> St W, Dickinson                         |
| Stark County Courthouse                 | Stark    | 51 3 <sup>rd</sup> St W, Dickinson                          |
| <b>LAW ENFORCEMENT</b>                  |          |   |
| Billings County Sheriff's Office        | Billings | 495 4 <sup>th</sup> St, Medora (Billings County Courthouse) |
| Medora Police Department                | Billings | 465 Pacific Ave, Medora (Medora Community Center)           |
| Dunn County Sheriff's Office            | Dunn     | 205 Owens St, Manning                                       |
| Killdeer Police Department              | Dunn     | 165 Railroad St, Killdeer                                   |

| Facility                       | County        | Address   |
|--------------------------------|---------------|---|
| Golden Valley Sheriff's Office | Golden Valley | 150 1 <sup>st</sup> Ave SE, Beach (Golden Valley County Courthouse) |
| Stark County Sheriff's Office  | Stark         | 66 W Museum Drive, Dickinson  |
| Dickinson Police Department    | Stark         | 2475 State Ave N, Dickinson   |
| <b>SCHOOLS &amp; COLLEGES</b>  |               |   |
| DeMores Elementary             | Billings      | 350 Broadway, Medora  |
| Prairie Elementary             | Billings      | 12793 20 <sup>th</sup> St, Fairfield                                |
| Killdeer Elementary School     | Dunn          | 101 High St NW, Killdeer  |
| Killdeer High School           | Dunn          | 1415 High St NW, Killdeer   |
| Beach High School              | Golden Valley | 600 N Central Ave, Beach  |
| Golva Elementary School        | Golden Valley | 301 Terrell Ave, Golva  |
| Home on the Range              | Golden Valley | 16351 I-94, Sentinel Butte  |
| Lincoln Elementary School      | Golden Valley | 201 1 <sup>st</sup> Ave SE, Beach                                   |
| Belfield Public School         | Stark         | 308 3 <sup>rd</sup> St NE, Belfield                                 |
| Dickinson High School          | Stark         | 1415 Empire Rd, Dickinson   |
| Dickinson Middle School        | Stark         | 2675 21 <sup>st</sup> St W, Dickinson                               |
| Dickinson State University     | Stark         | 291 Campus Dr, Dickinson  |
| Heart River Elementary School  | Stark         | 720 SW 7 <sup>th</sup> St, Dickinson                                |
| Jefferson Elementary School    | Stark         | 599 11 <sup>th</sup> Ave W, Dickinson                               |
| Lincoln Elementary School      | Stark         | 102 W 10 <sup>th</sup> St, Dickinson                                |
| Prairie Rose Elementary School | Stark         | 2785 10 <sup>th</sup> Ave W, Dickinson                              |
| Roosevelt Elementary School    | Stark         | 230 3 <sup>rd</sup> Ave E, Dickinson                                |
| Richardton-Taylor High School  | Stark         | 320 Raider Rd, Richardton   |
| South Heart Public School      | Stark         | 310 4 <sup>th</sup> St NW, South Heart                              |

| Facility                            | County | Address                             |
|-------------------------------------|--------|-------------------------------------|
| Southwest Community High School     | Stark  | 402 4 <sup>th</sup> St W, Dickinson |
| Taylor-Richardton Elementary School | Stark  | 306 Ertel Ave, Taylor               |
| Trinity Schools                     | Stark  | 810 Empire Rd, Dickinson            |

## Weather and Climate

Climate and weather patterns impact the region’s susceptibility to natural hazards, including severe summer weather, severe winter weather, flood, drought, and wildfire. This section reviews historical climate trends for the study area.

### CLIMATE VARIABILITY

The Northern Great Plains (NGP) region in general and the study area in particular have an extreme continental climate characterized by a very high annual variation in temperature (warm summers and cold winters) and a high daily range in temperatures, as compared to maritime climates. These high ranges in temperature are mainly due to the area’s location: in the mid-north latitudes (between 45.935° and 49.000° N), near the north border of the continental United States, centered in the North American Continent, and far from the modifying effect of oceans.

North Dakota’s range of extremes in heat and cold are only exceeded by two other states – Montana and Utah.<sup>1</sup> However, those two states’

colder minimum temperatures were recorded at the markedly higher elevations than exist in North Dakota.



*Severe winter weather and other hazards impact animals and livestock as well as humans. **Image Credit: The Dickinson Press***

<sup>1</sup> United States Extreme Record Temperatures & Differences (2014). Statewide Extremes. [https://ggweather.com/climate/extremes\\_us.htm](https://ggweather.com/climate/extremes_us.htm)



# HISTORICAL OVERVIEW

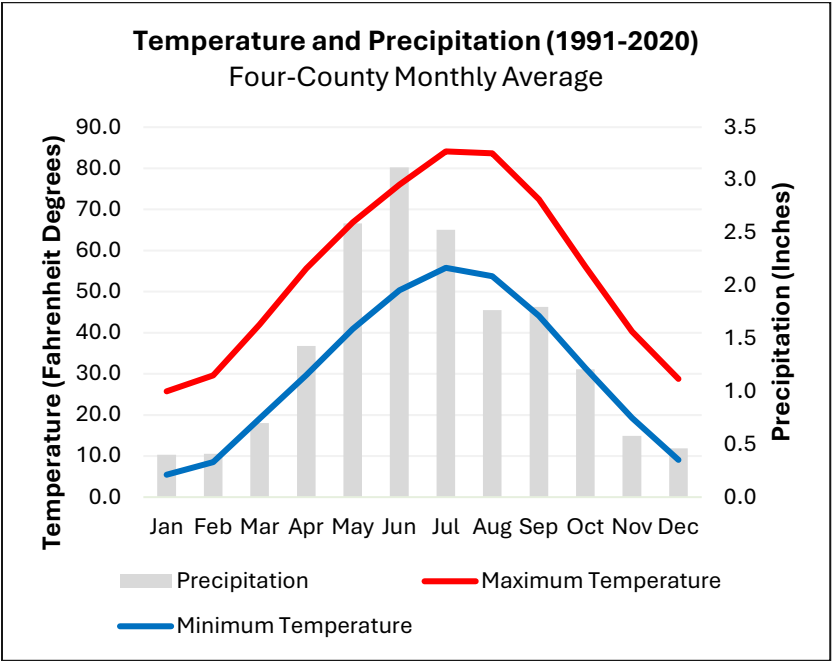
Historical climate trends are generally analyzed over:

- The most recent 30-year climate normal, a sliding scale that is updated every decade; and
- The entire period of record, i.e., all available data.

**Figure 6**, below, shows the average monthly precipitation and the range of monthly average high and low temperatures across the study area during the most recent 30-year climate period, 1991-2020.

**Table 8** provides the values.

**Figure 6. Thirty-Year Climate Trends**



Source: Climate Toolbox, 2024

**Table 8. Thirty-Year Climate Trends**

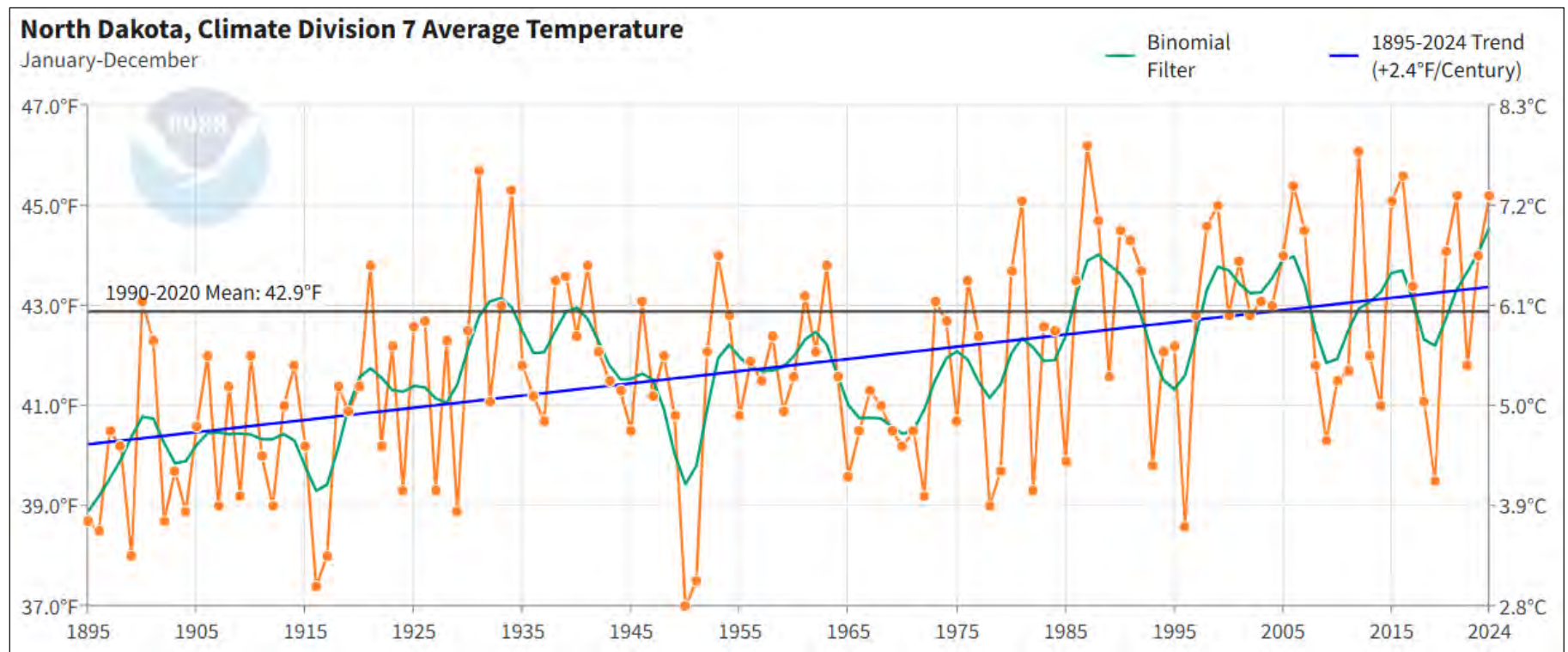
| Month  | PPT (in.) | Tmax (F) | Tmin (F) | Tavg (F) |
|--------|-----------|----------|----------|----------|
| Jan    | 0.40      | 25.74    | 5.45     | 15.60    |
| Feb    | 0.41      | 29.59    | 8.52     | 19.06    |
| March  | 0.70      | 42.02    | 19.07    | 30.55    |
| Apr    | 1.43      | 55.63    | 29.66    | 42.65    |
| May    | 2.53      | 66.83    | 40.87    | 53.85    |
| Jun    | 3.12      | 76.02    | 50.33    | 63.18    |
| Jul    | 2.53      | 84.11    | 55.79    | 69.95    |
| Aug    | 1.77      | 83.61    | 53.78    | 68.70    |
| Sep    | 1.80      | 72.45    | 44.12    | 58.28    |
| Oct    | 1.21      | 56.09    | 31.47    | 43.78    |
| Nov    | 0.58      | 40.31    | 19.26    | 29.79    |
| Dec    | 0.46      | 28.78    | 9.10     | 18.94    |
| Annual | 17.01     | 55.10    | 30.62    | 42.86    |

Source: Climate Toolbox, 2024

**Figure 7** and **Figure 8** on the following pages show the annual temperature pattern and the annual precipitation pattern, respectively, for the study area. They cover the entire long-term period of record, extending back to 1885, and include all climate data from 12 stations located within the study area and two additional stations in southern McKenzie County.

From **Figure 7**, Note the frequent changes from warmer to colder years, with patterns of changes that occur over a period of a few years to decades, and the subtle but steady warming trend of around 2.4°F per century. The average temperature of 42.9°F for the Four-County area is about 1.9°F warmer than the statewide average, while the rate of increase (trend) is two tenths of a degree Fahrenheit per century slower than the statewide average.

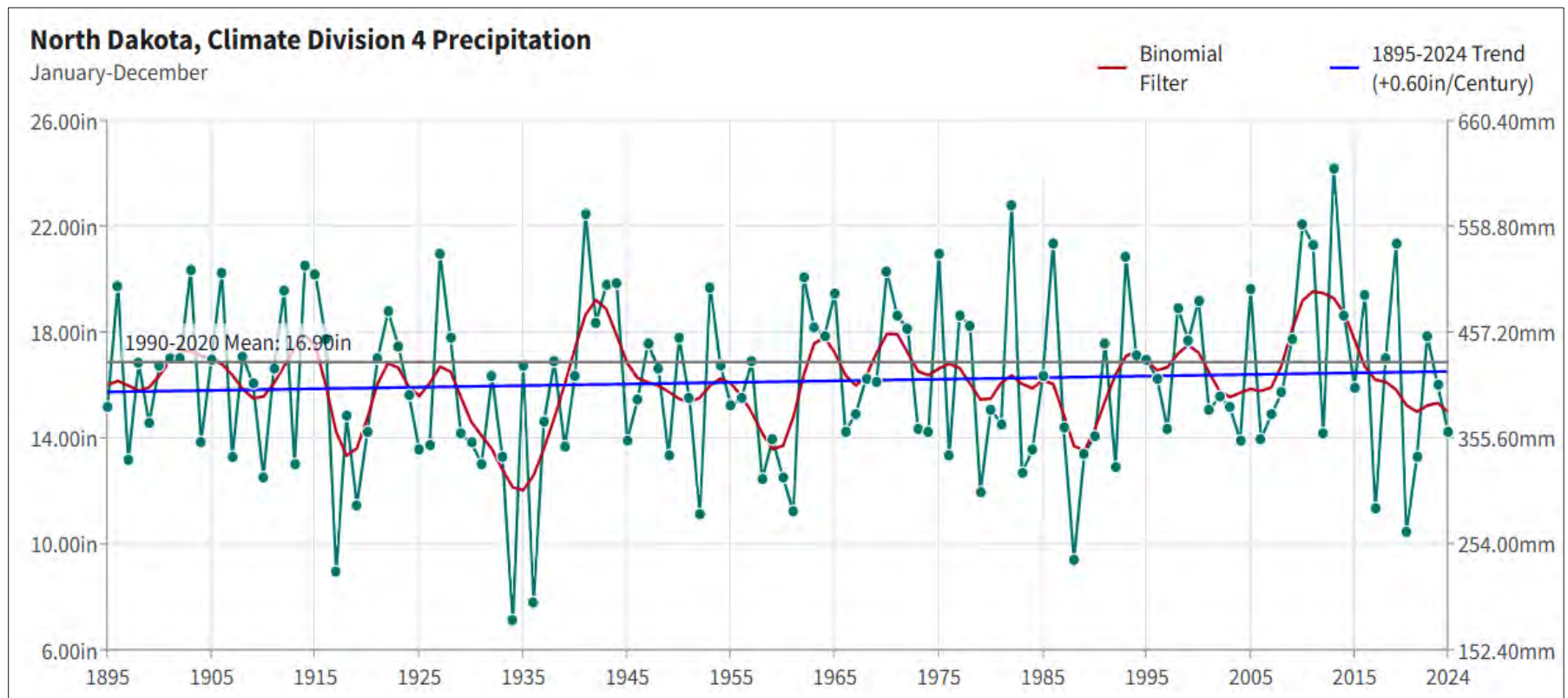
**Figure 7. Four-County Interannual to Multi-Decadal Variability in Temperature**



From **Figure 8**, note the frequent changes from much drier to much wetter years, the patterns of changes that occur over a period of a few years to decades, and the subtle but steady trend for increasing precipitation at around 0.60 inches per century. The current 30-year average precipitation of 17 inches for the Four-County area is about 2.72 inches lower than the statewide average, while the rate of increase (trend) is about 0.56 inches per century slower than the statewide average.

Moisture is a key component of climate. North Dakota is effectively located in a transition area from the moist eastern United States and the semiarid West. A high daily range in temperature is primarily due to the lower heat capacity of dry air and dry soils, which warm and cool at faster rates than moist air/soils and large bodies of water.

**Figure 8. Four-County Interannual to Multi-Decadal Variability in Precipitation**



# RECORD TEMPERATURES

**Table 9** provides record maximum and minimum temperatures for the four-county study area. The historical high and low for each county are shown in bold text. The record high and low for the entire study area are indicated by red and blue text, respectively. Of 12 stations reviewed, Dunn Center has exhibited the most extreme range in temperatures over its entire Period of Record, from an *all-time* low of -52°F on 15 Feb 1936 to an *all-time* high of 111°F on 6 July 1936. Note,

too, that Dunn Center has recorded a freezing temperature in each month of the year. The protracted dry conditions of the Great Plains Dust Bowl era led to the dramatically cold winter and dramatically hot summer conditions experienced statewide, and throughout that period.

**Table 9. Record Maximum and Minimum Temperatures**

| Location                    | Period of Record      | Record Maximum Temperature | Date               | Record Minimum Temperature | Date               |
|-----------------------------|-----------------------|----------------------------|--------------------|----------------------------|--------------------|
| <u>Billings County</u>      |                       |                            |                    |                            |                    |
| <b>Medora</b>               | <b>1948 - Current</b> | <b>110° F</b>              | <b>6 Jul 1936</b>  | <b>-49° F</b>              | <b>26 Jan 1950</b> |
| Sully Springs               | 2004 - Current        | 107° F                     | 25 Jul 2024        | -34° F                     | 13 Jan 2024        |
| Fairfield                   | 1955 - 2014           | 109° F                     | 30 Aug 2008        | -38° F                     | 21 Dec 1989        |
| <u>Dunn County</u>          |                       |                            |                    |                            |                    |
| Killdeer                    | 1998 - Current        | 109° F                     | 26 Jul 2024        | -36° F                     | 18 Feb 2025        |
| <b>Dunn Center 1E</b>       | <b>1919 - Current</b> | <b>111° F</b>              | <b>6 Jul 1936</b>  | <b>-52° F</b>              | <b>15 Feb 1936</b> |
| Manning 3SW                 | 1981 - Current        | 109° F                     | 7 Jul 2024         | -38° F                     | 19 Feb 2025        |
| <u>Golden Valley County</u> |                       |                            |                    |                            |                    |
| <b>Beach</b>                | <b>1906 - 2011</b>    | <b>110° F</b>              | <b>27 Jul 1917</b> | <b>-43° F</b>              | <b>15 Feb 1936</b> |
| Trotters 3SSE               | 1959 - 2011           | 110° F                     | 6 Jul 1981         | -37° F                     | 21 Dec 1989        |
| <u>Stark County</u>         |                       |                            |                    |                            |                    |
| <b>Dickinson Ag</b>         | <b>1893 - Current</b> | <b>114° F</b>              | <b>6 Jul 1936</b>  | -47° F                     | 12 Jan 2011        |
| Dickinson Airport           | 1948 - Current        | 109° F                     | 7 Jul 1981         | -36° F                     | 18 Feb 2025        |
| <b>Richardton</b>           | <b>1916 - Current</b> | 113° F                     | 6 Jul 1936         | <b>-48° F</b>              | <b>2 Feb 1917</b>  |
| Taylor 7NNW                 | 2011 - 2022           | 110° F                     | 24 Jul 2007        | -37° F                     | 14 Feb 2021        |

## HUMIDITY AND HEAT INDEX

**Humidity** is a measure of how much water vapor is in the air. The heat index is a function of air temperature and the relative humidity or dewpoint. A high heat index (high temperature combined with high humidity) makes the heat feel more intense and limits the human body's ability to cool itself through sweat evaporation.



### Definitions

**Relative Humidity** is the ratio of how much water vapor is in the air compared to how much the air can hold at a given temperature and pressure.

**Dewpoint Temperature** is a measure of the quantity of moisture in the air. When the Dewpoint equals the Air Temperature, Relative Humidity is maximized at 100 percent, and either dew, frost, or fog forms.

**Heat Index** is calculated using Air Temperature and either Dewpoint or Relative Humidity.

The record maximum dewpoint for North Dakota was set at 89°F near Wahpeton on July 19, 2021. With a concurrent air temperature of 91°F, the maximum Heat Index was 131°F. That day, dewpoint temperatures reaching more than 80°F overspread southwestern and western

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<sup>2</sup> CWOP (n.d.). What's Going on Here? <http://wxqa.com/>; Mesowest (n.d.). Maximum Wind Gust for ND - Bismarck CWA. <https://tinyurl.com/ms4mbzdd>; NDAWN Center (n.d.). NDAWN Station Locations. <https://ndawn.ndsu.nodak.edu/>

Minnesota, much of eastern South Dakota, most all of North Dakota along and east-northeast of the Missouri. (Gust, 2018). Within the study area, peak dewpoint readings of 78°F were recorded near Killdeer (EW7711), the Beach Airport (K20U) and nearby NDAWN station, and the Painted Canyon/Sully Springs RWIS station (ND006).<sup>2</sup> The highest dewpoint in the Four-County area was 79°F, recorded at the Dickinson Airport (KDIK). With air temperatures ranging from 90-95°F, the corresponding Heat Indices on that day ranged from 105-110°F.

## YOUR BODY'S COOLING SYSTEM

When you sweat, excess heat energy is used to convert sweat beads to vapor, cooling your body temperature. On humid days, the air is already saturated with moisture, so sweat does not evaporate as readily. This can lead to a feeling of being hot and sticky and can increase the risk of heat-related illnesses like heat exhaustion or heat stroke.

## WIND

Changes in windspeed and/or direction often indicate the passage of air mass boundaries, cold fronts or warm fronts, and related changes in weather. In current weather observation practice, windspeed and direction are measured at most automated and manual weather stations, but not necessarily at climate reporting stations.

## Definitions

**Sustained winds:** The highest windspeed average for any 2-minute period within a 10-minute observation period.

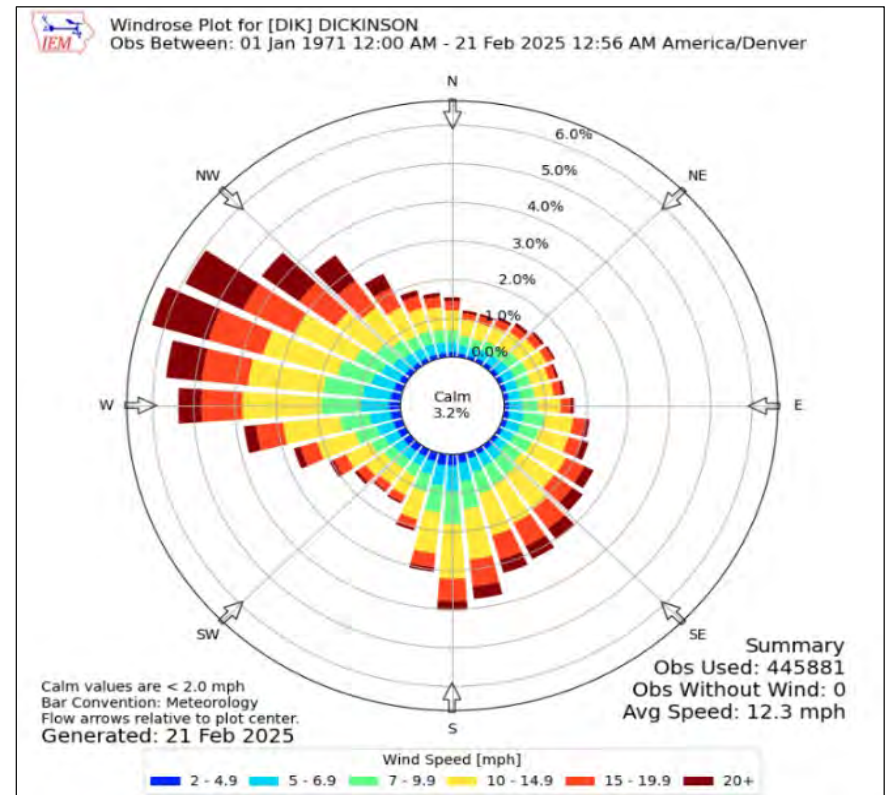
**Wind gust:** The highest 3-second measurement during the 10-minute observation period.

**Peak wind:** The maximum 3-second gust at any time during the hour.

Multi-source/composite wind energy estimates indicate that derived winds across the higher terrain along the Dunn and Billings County line, roughly between Fairfield and Manning, average near 12.9 mph, at 10 meters AGL, and near 19.9 mph at 100 meters AGL.<sup>3</sup> In the 216 sq. mi. area sampled for this estimate, average elevations range from 2400-2700 ft AMSL.

**Figure 9** shows the windrose for measured 10-meter winds at the Dickinson Airport (KDIK), located roughly six miles south of downtown Dickinson. Monthly and seasonal windroses for the KDIK location show that west-northwest winds dominate in every month of the year, but spring and summer months have more of a balance between west-northwest and south-southeast winds.

**Figure 9. Windrose Plot for Dickinson Airport**



## Wind Records

The **highest non-tornadic wind records of 105 mph for Stark County and >100mph for Golden Valley County** were estimated based on damage produced by two separate squall lines with embedded weak tornadoes which tracked across southwest and west-central ND on the 11<sup>th</sup> and 13<sup>th</sup> of June 1980. On 11 Jun 1980, wind blew the roof off of a house in Dickinson and destroyed several sheds

<sup>3</sup> Energydata (n.d.). Global Wind Atlas. <https://globalwindatlas.info/en>

and barns near Taylor. According to the NWS Bismarck, on 13 Jun 1980 “winds over 100 mph collapsed a small grandstand, moved an unoccupied house off its foundation, knocked trees down, blew the roof off a metal shed, downed power lines, and broke windows”.<sup>4</sup>

The **highest non-tornadic wind record of 115 mph for Dunn County** was measured at a farmstead 1 mile west of Halliday on 13 Jul 1997. Numerous trees were blown down, buildings damaged, and a tractor trailer was blown through a fence.

The **highest non-tornadic wind record of 120 mph for Billings County** was estimated based on wind damage produced from 8 miles west of Fairfield to 1 mile east. In this band, a 120 ft tall communications tower was toppled, numerous trees snapped, and a Quonset hut was thrown 150 yards.

Each of these extreme downburst wind damage events occurred as part of a larger thunderstorm squall line which produced widespread hail and wind damage across much of the southwest and west-central northwest and northcentral portions of the state, and at least one or more tornado or funnel cloud sighting among the several counties involved.

## FUTURE CLIMATE CONDITIONS

Recent climate change trends have shown, and future projections suggest that the state can expect continued gradual warming in all seasons, with greatest warming in the winter season. Overall precipitation is likely to increase, but with a high degree of inter-seasonal and interannual variability, which could lead to longer and

stronger droughts interspersed with more frequent and more intense flooding. Severe summer and winter season storms will likely continue to occur in both drier, drought-prone periods, and wetter, flood-prone periods within the state’s overall high climate variability.

According to the 2022 *North Dakota State Climate Summary*, the statewide average annual temperature has increased by over 2.6°F in the past 122 years (since 1901), and projections indicate the potential for an additional 1 to 9°F (0.6-5.0°C) increase above the current 1991-2020 average through mid-century.

According to information included in the 2024-2029 ND Enhanced Mitigation Mission Area Operations Plan (eMAOP) chapter on *ND Extreme Climate Variability and Potential Climate Change*, the state of North Dakota will *likely* experience the following changes in climate patterns across the state:

- More days with precipitation over a half inch, leading to an increased risk of flood hazards.
- Longer dry spells (consecutive days without precipitation), leading to an increased risk of drought and fire.
- More summer days with maximum temperatures over 95 degrees Fahrenheit and more summer nights with minimum temperatures over 65 degrees Fahrenheit, leading to increased risks from excessive heat.
- Increase in cool season precipitation (late fall, winter, and early spring).
- Slowly warming winters.

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<sup>4</sup> North Dakota County Statistics (n.d.). Stark County.

[https://www.weather.gov/media/bis/North\\_Dakota\\_County\\_Statistics.pdf](https://www.weather.gov/media/bis/North_Dakota_County_Statistics.pdf)

A firefighter in a field with a large fire in the background. The firefighter is wearing a helmet and a jacket with "COLLIER" on the back. The background shows a large fire with thick smoke rising into the sky. The scene is set in a field with a fence and some trees. The overall color scheme is a warm, reddish-orange hue.

# HAZARD RISKS & VULNERABILITIES

## Hazards Overview

The Billings-Dunn-Golden Valley-Stark Counties region has long faced a diverse range of hazards, both natural and human-caused, that threaten its communities, infrastructure, and economy. Over the years, these counties have encountered severe storms, flooding, drought, wildfires, and winter weather, among other challenges. Understanding these hazards and their impacts is crucial for improving resilience and ensuring public safety. This chapter profiles a range of hazards that impact the study area. It was developed using a variety of data sources and through discussion with regional stakeholders. Profiled hazards and threats are listed below, with links to each section.

### Natural Hazards

- [Drought](#)
- [Flood](#)
- [Geologic Hazards](#)
- [Severe Summer Weather](#)
- [Severe Winter Weather](#)
- [Space Weather](#)
- [Urban Fire](#)
- [Wildland Fire](#)

### Technological Hazards

- [Dam Failure](#)
- [Hazardous Materials Release](#)
- [Transportation Incidents](#)

### Adversarial Threats

- [Civil Disturbance](#)
- [Criminal Attack](#)
- [Cyberattack](#)
- [Infectious Disease & Pest Infestation](#)
- [Terrorist or Nation-State Attack](#)

## DISASTER DECLARATIONS

**Table 10** displays the record of Presidential Disaster Declarations from 1966 to 2023 for the four-county area. There were 26 unique presidential disaster declarations during this period. On average, the region has experienced about one disaster declaration every two years, most commonly for flooding, severe summer weather, and severe winter weather. Two disaster declarations were issued during the COVID-19 pandemic.

**Table 10. Four-County Presidential Disaster Declarations (1966-2023)**

| Year | Declaration | Hazard                                     | Affected Counties |      |               |       |
|------|-------------|--|-------------------|------|---------------|-------|
|      |             |  | Billings          | Dunn | Golden Valley | Stark |
| 2023 | DR-4717     | Flooding                                   |                   | Dunn | Golden Valley |       |
| 2022 | DR-4660     | Severe Winter Storm                        | Billings          | Dunn | Golden Valley |       |
| 2020 | EM-3477     | COVID-19                                   | Billings          | Dunn | Golden Valley | Stark |
| 2020 | DR-4509     | COVID-19                                   | Billings          | Dunn | Golden Valley | Stark |
| 2013 | DR-4128     | Severe Storms & Flooding                   |                   | Dunn |               | Stark |
| 2011 | DR-1986     | Severe Winter Storm                        |                   | Dunn |               |       |
| 2011 | DR-1981     | Flooding                                   | Billings          |      |               |       |
| 2010 | DR-1901     | Severe Winter Storm                        |                   | Dunn |               |       |
| 2010 | DR-1879     | Severe Winter Storm                        | Billings          | Dunn | Golden Valley | Stark |
| 2009 | DR-1829     | Severe Storms & Flooding                   | Billings          | Dunn |               | Stark |
| 2005 | DR-1616     | Severe Winter Storm                        | Billings          | Dunn | Golden Valley | Stark |
| 2005 | DR-1597     | Severe Storms, Flooding, Ground Saturation |                   |      |               | Stark |
| 2004 | EM-3196     | Snow                                       |                   | Dunn |               |       |
| 2001 | DR-1376     | Flooding                                   |                   |      | Golden Valley |       |
| 2001 | DR-1353     | Winter Storm                               |                   |      | Golden Valley |       |
| 1997 | DR-1157     | Severe Winter Storms/Blizzards             | Billings          | Dunn | Golden Valley | Stark |
| 1997 | DR-1174     | Severe Storms, Flooding                    | Billings          | Dunn | Golden Valley | Stark |
| 1993 | DR-1001     | Severe Storms                              |                   |      |               | Stark |
| 1978 | DR-554      | Ice Jams, Snowmelt, Flooding               | Billings          | Dunn | Golden Valley | Stark |
| 1978 | EM-3061     | Blizzard and Snowstorms                    | Billings          |      | Golden Valley |       |
| 1976 | EM-3016     | Drought                                    |                   | Dunn |               |       |
| 1975 | DR-469      | Flooding from Rains, Snowmelt              |                   | Dunn |               |       |

| Year | Declaration | Hazard                   | Affected Counties |      |  |       |
|------|-------------|--------------------------|-------------------|------|--|-------|
| 1972 | DR-335      | Severe Storms & Flooding |                   |      |  | Stark |
| 1970 | DR-287      | Severe Storms & Flooding |                   | Dunn |  | Stark |
| 1969 | DR-256      | Flooding                 |                   | Dunn |  | Stark |
| 1966 | DR-220      | Severe Storms & Flooding |                   |      |  | Stark |

Source: FEMA

## HAZARD PROFILES

This chapter profiles each natural hazard, human-caused/technological hazard, and adversarial threat. Each hazard profile includes:

- **Overview:** A general description of the hazard and risks within the study area.
- **Location:** The geographic area(s) at risk.
- **Probability and Extent:** Historical occurrences of the hazard, the future probability of occurrence, and the probable extent of occurrence.
- **Vulnerabilities and Impacts:** Potential impacts to the regional economy, community assets, or specific populations.
- **Future Conditions.** The long-term outlook given current development trends and climate trends.

1. **Improbable:** The hazard does not exist; the likelihood of future occurrence is effectively 0 percent.
2. **Unlikely:** The annual probability of occurrence is greater than 0 percent but less than 1 percent.
3. **Possible:** The annual probability of occurrence is at least 1 percent but less than 10 percent.
4. **Likely:** The annual probability of occurrence is at least 10 percent but less than 100 percent.
5. **Very Likely:** The annual probability of occurrence is essentially 100 percent.

Impacts can be evaluated in terms of human consequences, economic consequences, government consequences, or social consequences (**Table 11 & Table 12**). Understanding the probability and impact of each hazard is important for prioritizing hazard mitigation efforts.

## PROBABILITY AND IMPACTS

Risk is a function of probability and impact. Probability is the likelihood that a hazard event will occur in the study area in future years. The MHMP assesses probability on a five-point scale:

**Table 11. Impact Ratings**

| Consequences                   | Scale of Impacts and Consequences (Most Likely Outcome) |   |  |  |   |
|--------------------------------|---|---|--|--|---|
|                                | 1 None/Negligible                                       | 2 Minor   | 3 Moderate   | 4 Significant  | 5 Catastrophic  |
| <b>Human Consequences</b>      | 0 fatalities and 0 injuries                             | 1-2 fatalities and/or fewer than 10 injuries              | 3-5 fatalities and/or fewer than 20 injuries                                   | 10-20 fatalities and/or fewer than 50 injuries                                   | More than 20 fatalities and/or 50 or more injuries  |
| <b>Economic Consequences</b>   | Up to \$100,000   | \$100,000 to \$1 million                                  | \$1 million to \$10 million  | \$1 million to \$100 million   | More than \$100 million   |
| <b>Government Consequences</b> | No measurable change in government function             | Minor changes in government function                      | Moderate interruption or change in the ability to provide government functions | Widespread and significant change in the ability to provide government functions | Widespread and prolonged loss of government functions                                       |
| <b>Societal Consequences</b>   | No measurable change to behavior                        | Occasional or minor loss of nonessential social functions | Loss of many nonessential social functions                                     | Loss of essential social functions; disruption of behavior                       | Widespread loss of essential social functions; loss of belief in government or institutions |

# RISK = Probability X Impact

Table 12. Risk Matrix

|           |              | Probability   |  |                |             |
|-----------|--------------|---------------|--|----------------|-------------|
|           |              | Improbable    |  |                | Very Likely |
| Impact    | None         | Very Low Risk |  |                |             |
|           | Catastrophic | Low Risk      |  | Moderate Risk  |             |
| High Risk |              |               |  | Very High Risk |             |
|           |              |               |  |                |             |



## Public Risk Perception

At public workshops conducted during the MHMP planning process, participants were asked to evaluate the probability and impact of various hazard types. Their feedback is summarized throughout this section.

# Natural Hazards

Profiled natural hazards include:

- [Drought](#)
- [Flood](#)
- [Geologic Hazards](#)
- [Severe Summer Weather](#)
- [Severe Winter Weather](#)
- [Space Weather](#)
- [Urban Fire](#)
- [Wildland Fire](#)

## DROUGHT

### Overview

- **Overall Risk:** High to Very High
- **Probability:** Likely (50% annual probability of a D1 drought; 25% annual probability of a D2 drought; 10% annual probability of a D3 drought)
- **Impact:** Significant economic consequences
- **Primary Impacts:** Agricultural loss (crops/livestock) and losses in other industries; increased fire risk and loss of potable water
- **Related Hazards:** Wildland/Urban Fire

**Drought is defined as a deficiency of precipitation over a prolonged period resulting in water shortage.** If severe enough, this deficiency can reduce water levels and soil moisture below what is needed to sustain crops, animals, and human life systems. Drought is normal, recurring phenomenon that can last multiple years, even

decades. Impacts are highly variable based on time of year, amount of water stored in the soil, and meteorological factors such as temperature, humidity, and wind. Impacts are also affected by human factors such as local water demand and water management practices.

Beyond precipitation, numerous factors and feedback loops contribute to drought conditions. For example, low water tables and reduced stream flows influence soil moisture levels. Higher temperatures can cause increased levels of evapotranspiration, resulting in reduced atmospheric moisture and potentially reduced rainfall.

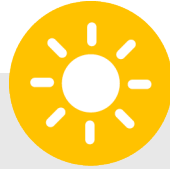
### Location

Drought occurs at a regional level, generally across the entire geographical area of a county. Although drought conditions may vary across the four-county study area simply because it is so large, all parts of the study area are assumed to be at equal risk.

### Probability and Extent

Significant droughts impact North Dakota approximately once per decade, with previous droughts occurring in the 1930s, 1950s, 1960s, 1970s, 1980s, 2000s, 2010s, and 2020s.

- D0 – 70.1 percent of observational periods
- D1 – 46.7 percent
- D2 – 26.5 percent
- D3 – 8.8 percent
- D4 – 1.7 percent



## Drought Severity

Drought severity is measured by the U.S. Drought Monitor (USDM) which classifies drought intensity ranging from D0 (abnormally dry) to D4 (exceptional drought) (Table 13). The USDM uses a “convergence of evidence” from both physical indicators as well as field observations and local insight from a network of 450 experts. Using many different types of data and reconciling them with expert interpretation is what makes the USDM unique. Among the numeric inputs considered by the USDM are precipitation, streamflow, reservoir levels, temperature and evaporative demand, soil moisture, and vegetation health. No single piece of evidence tells the full story, and neither do strictly physical indicators. That’s why the USDM isn’t just a statistical model, but also relies on the previously described expert input.

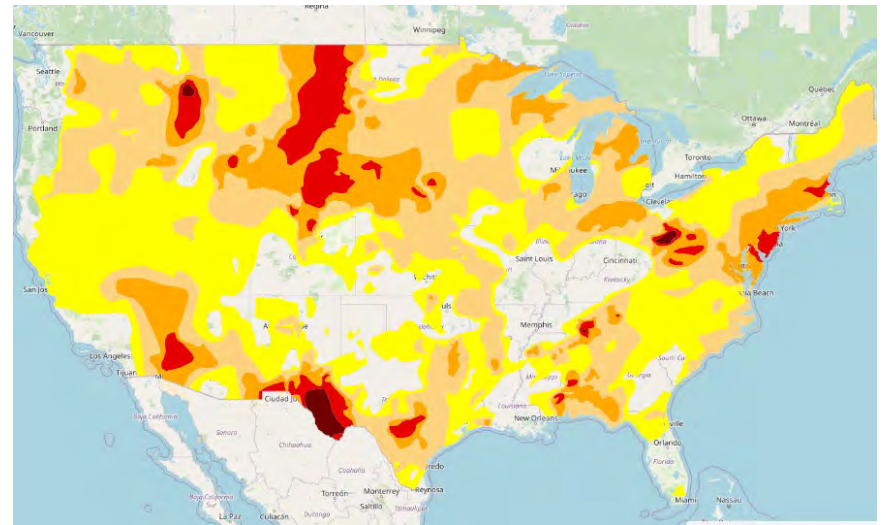
**Figure 10** on the following page shows drought conditions for the four-county region over the past 25 years. The height of the bars indicates the percentage of the study area impacted by drought. The color of the bars indicates drought severity on a scale of D0 (abnormally dry) to D4 (exceptional drought). Extreme droughts impacted the majority of the study area in 2008, 2017, 2021, and 2025.

### USDA Secretarial Drought Disaster Designations

Although there has been just one instance in which a Presidential Disaster Declaration was issued for drought for the four-county region, the USDA has issued numerous drought disaster declarations for the region. The USDA notes that drought disaster designations are

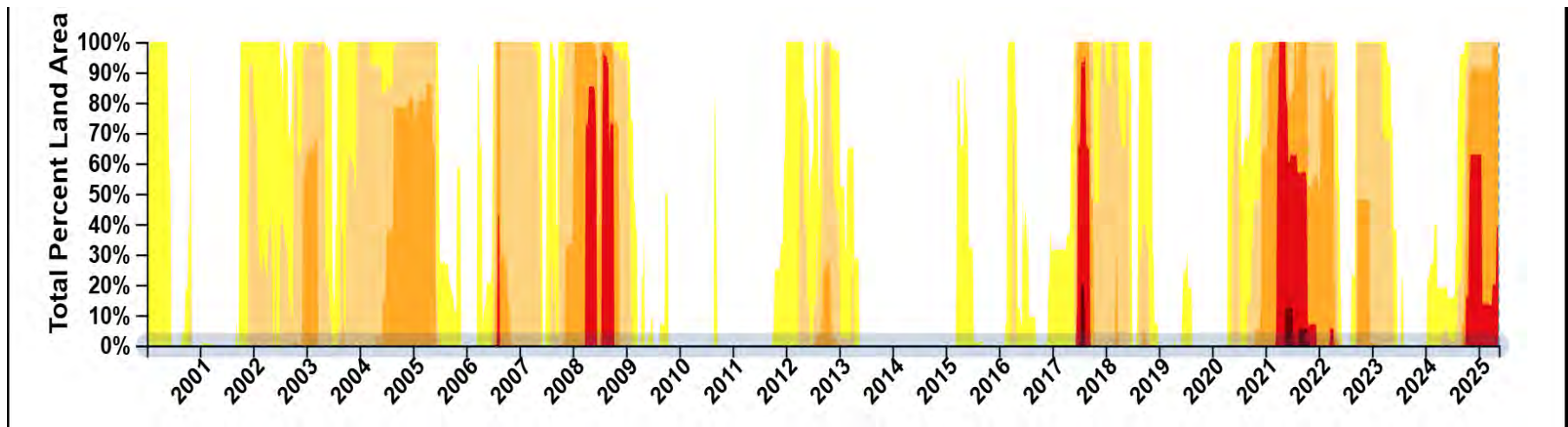
common, even during periods of high production. The USDA makes emergency loans and other assistance programs available to producers suffering losses in counties receiving the drought disaster designation. Since 2012, there have been 18 drought-related disaster designations for Billings County, 17 for Dunn County, 25 Golden Valley County, and 20 for Stark County.

**Table 14** displays USDA Secretarial Drought Disaster Designations for the four-county area. There were 40 unique secretarial disaster declarations during this period. These declarations have been issued separately from Presidential Disaster Declarations since 2012.



*Wide swathes of the United States were experiencing drought events during the week of November 19, 2024. Image Credit: United States Drought Monitor Weekly, USDA*

**Figure 10. Historical Droughts**



Source: National Integrated Drought Information System (Drought.gov)

**Table 13. Possible Impacts and Standardized Precipitation Index for Drought Categories**

| Category  | Description                | Possible Impacts  | Standardized Precipitation Index |
|-----------|----------------------------|---|----------------------------------|
| <b>D0</b> | <b>Abnormally Dry</b>      | Going into drought: Short-term dryness slowing planting, growth of crops/pastures. Coming out of drought: Some lingering water deficits; pastures/ crops not fully recovered. | -0.5 to -0.7                     |
| <b>D1</b> | <b>Moderate Drought</b>    | Some damage to crops/pastures; low streams, reservoirs, or wells; some water shortages developing or imminent; voluntary water-use restrictions requested.                    | -0.8 to -1.2                     |
| <b>D2</b> | <b>Severe Drought</b>      | Crop/pasture losses likely; water shortages common; water restrictions imposed.   | -1.3 to -1.5                     |
| <b>D3</b> | <b>Extreme Drought</b>     | Major crop/pasture losses; widespread water shortages or restrictions.  | -1.6 to -1.9                     |
| <b>D4</b> | <b>Exceptional Drought</b> | Exceptional and widespread crop/pasture losses; shortages of water in streams, reservoirs, and wells creating water emergencies.  | -2.0 or less                     |

**Table 14. Four-County USDA Secretarial Drought Disaster Declarations (2012-2025)**

| Year | Declaration | Description of Disaster                      | Affected Counties |      |               |       |
|------|-------------|--|-------------------|------|---------------|-------|
| 2025 | S5971       | Drought-FAST TRACK                           | Billings          | Dunn | Golden Valley | Stark |
| 2025 | S5991       | Drought-FAST TRACK                           | Billings          |      | Golden Valley |       |
| 2025 | S6012       | Drought-FAST TRACK                           |                   |      | Golden Valley |       |
| 2024 | S5807       | Drought-FAST TRACK                           | Billings          | Dunn | Golden Valley | Stark |
| 2024 | S5821       | Drought-FAST TRACK                           |                   |      | Golden Valley |       |
| 2024 | S5822       | Drought-FAST TRACK                           | Billings          | Dunn | Golden Valley | Stark |
| 2024 | S5918       | Drought, Excessive Heat, and High Winds      |                   | Dunn |               | Stark |
| 2022 | S5162       | Drought-FAST TRACK                           | Billings          | Dunn | Golden Valley | Stark |
| 2022 | S5333       | Drought-FAST TRACK                           |                   |      | Golden Valley |       |
| 2022 | S5336       | Drought-FAST TRACK                           |                   |      | Golden Valley |       |
| 2022 | S5366       | Drought                                      | Billings          | Dunn | Golden Valley | Stark |
| 2020 | S4840       | Drought-FAST TRACK                           |                   |      |               | Stark |
| 2020 | S4948       | Drought                                      | Billings          | Dunn | Golden Valley | Stark |
| 2020 | S4950       | Drought, freeze, and frost                   | Billings          |      | Golden Valley | Stark |
| 2018 | S4489       | Drought                                      |                   |      |               | Stark |
| 2017 | S4186       | Drought-FAST TRACK                           | Billings          | Dunn | Golden Valley | Stark |
| 2017 | S4190       | Drought-FAST TRACK                           |                   |      | Golden Valley |       |
| 2017 | S4191       | Drought-FAST TRACK                           | Billings          | Dunn | Golden Valley | Stark |
| 2017 | S4330       | Drought                                      | Billings          | Dunn | Golden Valley | Stark |
| 2016 | S4035       | Drought-FAST TRACK                           |                   |      | Golden Valley |       |
| 2016 | S4138       | Drought                                      | Billings          | Dunn | Golden Valley | Stark |
| 2015 | S3961       | Drought, excessive heat, high winds and hail | Billings          | Dunn | Golden Valley |       |

| Year | Declaration | Description of Disaster  | Affected Counties |      |               |       |
|------|-------------|--|-------------------|------|---------------|-------|
| 2015 | S3960       | Freeze, frost, and drought   | Billings          | Dunn | Golden Valley | Stark |
| 2014 | S3804       | Combined effects of deep ground frost, colder than average winter, cooler than normal spring temperatures, significant rainfall, ground saturation, frost, and freeze, severe thunderstorms, hail, high winds, drought, weather related insects and disease          | Billings          | Dunn | Golden Valley | Stark |
| 2013 | S3620       | Combined effects of spring snowstorms, significant rainfall, unseasonably cool spring, frosts and freeze damage, flooding, ground saturation, severe thunderstorms, hail damage, high winds, weather-related insects and diseases, and mid-summer drought conditions |                   | Dunn |               | Stark |
| 2012 | S3405       | Drought-FAST TRACK   | Billings          | Dunn | Golden Valley | Stark |
| 2012 | S3424       | Drought-FAST TRACK   | Billings          | Dunn |               | Stark |
| 2012 | S3467       | Combined effects of frosts and freezes, flooding, severe thunderstorms, hail, high winds, drought, and weather-related insect and disease damage   | Billings          | Dunn | Golden Valley | Stark |
| 2012 | S3416       | Combined effects of early spring frosts and freezes, drought, excessive heat, high winds, wildfires, insects, hail, lightning, tornadoes   |                   |      | Golden Valley |       |
| 2012 | S3437       | Combined effects of early spring frosts and freezes, drought, excessive heat, high winds, wildfires, insects, and hail   |                   |      | Golden Valley |       |

Source: USDA

Note: There were no recorded declarations for the four-county area in 2023. Data for 2021 is currently unavailable.

## Vulnerabilities and Impacts

### Population

Except in severe cases, drought does not directly endanger human life or health. However, drought greatly increases the risk of wildland fire, which is a potentially life-threatening hazard. Drought increases fire risk by drying out fuel sources and by creating water shortages that may inhibit fire response.

### Economy

The agricultural economy is highly vulnerable to drought. Droughts impact farmers and livestock producers by reducing the productivity of cropland and rangeland, disrupting reproductive cycles, and increasing costs of irrigation, watering, or finding supplemental feed or pasture. Agricultural impacts can be quantified in terms of indemnity payments or higher insurance premiums (**Table 15**). In addition to agriculture, other vulnerable industries include the energy and tourism. Energy development activities such as fracking are water-intensive uses that could compete with local water supplies and agricultural uses in times of drought.

**Table 15. Drought Indemnity Payments (1989-2021)**

| County        | Total Payments         | Annual Average       |
|---------------|------------------------|----------------------|
| Billings      | \$21.5 million         | \$650,000            |
| Golden Valley | \$49.7 million         | \$1.5 million        |
| Dunn          | \$66.7 million         | \$2.0 million        |
| Stark         | \$113.5 million        | \$3.4 million        |
| <b>Total</b>  | <b>\$251.4 million</b> | <b>\$7.6 million</b> |

Source: USDA Ag Risk Viewer

## Drought Relief Programs

Numerous federal programs provide funding assistance for drought relief, including the Supplemental Disaster Relief Program (SDRP) and Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish (ELAP). The North Dakota State Water Commission provides cost-share assistance to livestock producers who need to develop emergency water supplies. Local agencies such as the Billings County Water Resource Board also provide assistance.

## Critical Facilities

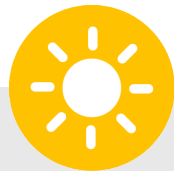
Chapter 2 describes critical facilities in the study area. Drought directly impacts water treatment plants and public water systems by lowering reservoir levels, depleting groundwater aquifers, and reducing stream flows. Severe droughts can lead to water shortages for drinking, sanitation, and fire suppression. Droughts can also lead to land subsidence or sinkholes, which can damage critical infrastructure including roads, buildings, and pipelines. A lack of water could impact large industrial uses, such as natural gas plants or data centers that use large volumes of water for cooling.

The four-county area is served by the Southwest Water Authority (SWA), which has water treatment plants in Dickinson and in nearby Mercer County. Lake Sakakawea is the water source for both plants. Most communities and residents in the four counties are served by the Southwest Water Pipeline. The risk of drought causing a loss of this water supply is very remote. However, some residents not served by the SWA depend on personal wells, particularly in more rural/remote locations.

## Future Conditions

Chapter 2 describes regional growth trends. Future development can increase the risk of drought by increasing water demand. Future industrial development, especially, will increase water demand. Industrial growth will continue to be focused in Dunn County and Stark County. However, all four counties are served by one regional water provider, so a large-scale development could impact water supply on a regional level.

Looking forward, the annual probability of drought is 100 percent (very likely). Through the end of this century, expect larger and more intense droughts (i.e., more D2, D3, and D4 droughts occurring over larger areas). Potential impacts include more episodes of extreme heat with increased human, animal, and crop stress; more rapid onset of drought conditions or flash drought; more drought-related erosion; and reductions in the overall agricultural economy. Drought impacts on the agriculture industry and municipal systems will likely be exacerbated.



### Risk Perception

Workshop participants perceived that future droughts are **very likely (4.47)** and that future impacts would be **significant (4.12)**.

# FLOOD

## Overview

- **Overall Risk:**
  - Billings: Moderate
  - Dunn: Moderate
  - Golden Valley: Low
  - Stark: Moderate
- **Probability:** Likely (30% annual probability of a flood occurrence in any County)
- **Primary Impacts:** Agricultural loss (crops/livestock); blocked or washed-out roads, economic loss, human loss and injuries, localized evacuation, power loss, property damage
- **Related Hazards:** Severe Summer Weather, Severe Winter Weather, Geologic Hazards, Hazardous Materials Release



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

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

A Flood Insurance Rate Map (FIRM) determines flood insurance rates for each participating community. The FIRM identifies Special Flood

Hazard Areas (SFHA) that have a one percent annual chance of flooding, commonly referred to as the 100-year floodplain, and other flood hazard areas. Flood insurance is required for all property owners who acquire a loan from a federally regulated, supervised, or insured financial institution for the acquisition or improvement of land, facilities, or structures located within an SFHA.



*The 3<sup>rd</sup> Avenue underpass in Dickinson flooded during heavy rains in 2011. The City is working to make municipal infrastructure more resilient. **Image Credit: The Dickinson Press***

Areas outside the SFHA are considered to be in the Non-Special Flood Hazard Area (NSFHA). Structures in the NSFHA may still be at risk from flooding; according to FEMA, one in every four floods occurs in an NSFHA.

Twelve of the 14 cities in the study area are participants in the NFIP (only Golve and Sentinel Butte in Golden Valley County do not participate). Some FIRMs are more up-to-date than others. An

updated FIRM was adopted for Belfield in 2022 and updated FIRMs were adopted for the remainder of Stark County in 2024. However, the updated for the rest of Stark County in Stark County updated FIRMs county-wide in 2024. Meanwhile, most of the FIRMs for Dunn County communities date to the 1980s, as does the FIRM for Medora (**Table 16**).

FIRMS have been issued for two communities – Richardton and Gladstone – that do not participate in the NFIP. Currently, NFIP participation is not a priority for these communities, given the low risk of riverine flooding due to low probabilities and a very limited number of structures and facilities being located within a flood hazard zone.

As part of the NFIP, participating communities must have substantial damage / improvement provisions within their floodplain regulation enforcement ordinances. These provisions state that a “substantial improvement” occurs when the cost of any reconstruction, rehabilitation, addition, or other improvement to a building equals or exceeds 50 percent of its market value before construction. If this threshold is met, the entire structure must be brought into compliance with current flood-resistant building codes (typically requiring the building to be elevated). Generally, jurisdictions within the four-county study area identify and determine the level of damage to buildings after a flood event by site-inspections and building permit applications.

**Table 16. NFIP Participation**

| Community              | Initial Criteria Adoption Date | Current Effective Map Date | Regular Emergency Date | Implementation Designee                    | Regulation Location  | Floodplain Regulation Enforcement        | Substantial Damage / Improvement Provisions   |
|------------------------|--------------------------------|----------------------------|------------------------|--|--|--|---|
| <b>Billings County</b> | <b>NA</b>                      | <b>(NSFHA)</b>             | <b>03/25/86</b>        | <b>Tax &amp; Zoning Administrator</b>      | <b>Not applicable.</b>   | <b>Not being administered.</b>           | <b>Not applicable.</b>  |
| Medora                 | 09/29/89                       | 09/29/89                   | 09/29/89               | City Auditor                               | City of Medora Land Development Code – Chapter 17: Flood Plain   | Floodplain development permit required.  | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.        |
| <b>Dunn County</b>     | <b>03/01/84</b>                | <b>12/07/17</b>            | <b>03/01/84</b>        | <b>Planning &amp; Zoning Administrator</b> | <b>Dunn County Land Development Code – III. Zoning Districts and Official Zoning Map – I. Floodplain Overlay District</b>                            | <b>A development permit is required.</b> | <b>Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.</b> |
| Dodge                  | 08/12/80                       | 03/01/84                   | 08/12/80               | City Auditor                               | <u>No City-Specific Ordinance</u> Dunn County Land Development Code – III. Zoning Districts and Official Zoning Map – I. Floodplain Overlay District | A development permit is required.        | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.        |

| Community                   | Initial Criteria Adoption Date | Current Effective Map Date | Regular Emergency Date | Implementation Designee  | Regulation Location  | Floodplain Regulation Enforcement  | Substantial Damage / Improvement Provisions   |
|-----------------------------|--------------------------------|----------------------------|------------------------|--------------------------|--|--|---|
| Dunn Center                 | 12/01/83                       | 12/01/83                   | 12/01/83               | City Auditor             | Dunn Center Land Development Code – D. Zoning District Regulations – 10. Floodplain Management Overlay District (FO) | Floodplain development permit required for any development within the Floodplain Management Overlay District.    | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.        |
| Halliday                    | 12/01/83                       | 06/22/98                   | 12/01/83               | Building Inspector       | Land Development Code, City of Halliday, ND – 3.8 F-Floodplain Overlay District                                      | Building permit is required with City Engineer approval prior to development in the Floodplain Overlay District. | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.        |
| Killdeer                    | 04/17/89                       | 04/17/89                   | 12/01/83               | City Administrator       | City of Killdeer Home Rule Charter – Chapter XII: Flood Damage Prevention Ordinance                                  | A development permit is required for any construction within any special flood hazard area.                      | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.        |
| <b>Golden Valley County</b> | <b>09/19/25</b>                | <b>09/19/25</b>            | <b>04/12/89</b>        | <b>Emergency Manager</b> | <b>Golden Valley County Zoning Ordinance – 3.11 Floodplain Overlay District</b>                                      | <b>A development permit is required.</b>   | <b>Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.</b> |

| Community           | Initial Criteria Adoption Date | Current Effective Map Date | Regular Emergency Date | Implementation Designee                    | Regulation Location   | Floodplain Regulation Enforcement   | Substantial Damage / Improvement Provisions   |
|---------------------|--------------------------------|----------------------------|------------------------|--|---|---|---|
| Beach               | 09/29/86                       | 09/19/25                   | 09/29/86               | City Auditor,<br>Zoning Administrator      | Beach Ordinance Book – Chapter XVIII. Flood Plain                         | A development permit is required prior to construction or development within any area of a special flood hazard established in Section 18.0302. | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.        |
| Golva               | NA*                            | N/A*                       | N/A*                   | N/A*                                       | N/A*  | N/A*  | N/A*  |
| Sentinel Butte      | NA**                           | N/A**                      | 03/11/86               | N/A**                                      | N/A**   | N/A**   | N/A**   |
| <b>Stark County</b> | <b>11/09/71</b>                | <b>08/28/24</b>            | <b>11/05/71</b>        | <b>Planning &amp; Zoning Administrator</b> | <b>Stark County Zoning Ordinance – Article 3.11 Floodplain Management</b> | <b>A development permit is required.</b>  | <b>Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.</b> |
| Belfield            | 09/05/79                       | 07/05/22                   | 09/05/79               | City Auditor                               | Belfield Code of Ordinances – Chapter XVII Regulation of Flood Plain      | A development permit is required before construction or development begins within any special flood hazard area established in Section 3.2.     | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines.        |

| Community  | Initial Criteria Adoption Date | Current Effective Map Date | Regular Emergency Date | Implementation Designee                 | Regulation Location   | Floodplain Regulation Enforcement   | Substantial Damage / Improvement Provisions  |
|------------|--------------------------------|----------------------------|------------------------|---|---|---|--|
| Dickinson  | 06/01/78                       | 08/28/24                   | 06/01/78               | City Administrator, Asst. City Engineer | Dickinson Code of Ordinances – Chapter 20 Floods – Sec. 20-43 Establishment of development permit | A development permit shall be obtained before construction, or development begins within any special flood hazard area established in Section 20-7. | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines. |
| Gladstone  | 11/04/10                       | 08/28/24                   | 08/13/77               | City Engineer                           | City of Gladstone Zoning Ordinance – 4.10 Floodplain Overlay District (F)                         | Before construction or development begins within any area of special flood hazard, a permit shall be obtained from the Code Administrator.          | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines. |
| Richardton | 11/04/10                       | 08/28/24                   | N/A***                 | City Auditor                            | Richardton Ordinances – Chapter 6. Zoning and Land Use Planning                                   | A development permit is required before construction or development begins.   | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines. |
| Taylor     | 08/12/80                       | 08/28/24                   | 08/12/80               | City Auditor                            | City of Taylor Ordinances   | A development permit is required before construction or development begins.   | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines. |

| Community   | Initial Criteria Adoption Date | Current Effective Map Date | Regular Emergency Date | Implementation Designee | Regulation Location         | Floodplain Regulation Enforcement   | Substantial Damage / Improvement Provisions  |
|-------------|--------------------------------|----------------------------|------------------------|-------------------------|-----------------------------|---|--|
| South Heart | 02/19/86                       | 08/28/24                   | 02/19/86               | City Auditor            | South Heart City Ordinances | A development permit is required before construction or development begins. | Adheres to new construction and substantial improvements by issuing permits and following NFIP guidelines. |

\*A FIRM has never been issued for Golva

\*\*Sentinel Butte has a No Special Flood Hazard Area determination

\*\*\*Community does not participate in the National Flood Program

Source: [FEMA Community Status Book](#)

## Location

Each of the four counties is at risk from flooding. **Figure 11** through **Figure 22** at the end of this section map flood hazard zones for NFIP-participating communities. **The cities most at risk to flooding are Medora, Dickinson, Belfield, Halliday, and Beach.** Note that in the recent FIRM update for Sentinel Butte, it was determined that no areas were within an SFHA. For this reason, Sentinel Butte does not appear in the flood hazard maps.

## Probability and Extent

The four counties were included in 13 flood-related presidential disaster declarations from 1966 through 2023, the most recent of which was issued for Dunn County and Golden Valley County in 2023. Historically, the most significant flooding issues are localized ponding and inundated/washed out roadways resulting from heavy rains, snowmelt, and runoff. There is minimal history of riverine flooding

events with significant impacts. **Table 18** on the following page summarizes flood events in the study area for the past three decades.

There are two river locations with forecast points located within the four-county area. These are the Little Missouri River at Medora, and the Knife River at Manning. These two locations have river stages for use as their extent scale (**Table 17**).

**Table 17. Manning and Medora Flood Stages**

| Flood Stage Category | Manning Flood Stage | Medora Flood Stage |
|----------------------|---------------------|--------------------|
| Major Flooding       | 20 ft               | 20 ft              |
| Moderate Flooding    | 18 ft               | 17 ft              |
| Minor Flooding       | 15 ft               | 15 ft              |
| Action               | 13 ft               | 13 ft              |

## ANNUAL FLOOD RISK

From 1996-2024, there were 32 flood events in the study area – just over one occurrence per year. Property damage was recorded in 12 events and crop damage was recorded in two events. Dunn County was the most susceptible to flooding with 13 events in 28 years (46% annual probability). Several roadway washouts occurred following heavy rains in Dunn County in 2023. **The annual probability of a flood event in the four-county area is approximately 30 percent.**



A washed-out section of 92<sup>nd</sup> Avenue in Dunn County.

**Table 18. Flood Events (1996-2024)**

| Flood Events by Sub-Type | County Event Days (Over 29-Year Period) |            |               |           | Discrete Event Days (Region) | Days per Year (Region) | Annual Probabilities (Percent Years w/ an Occurrence) |              |               |              |               |
|--------------------------|---|------------|---------------|-----------|------------------------------|------------------------|---|--------------|---------------|--------------|---------------|
|                          | Billings                                | Dunn       | Golden Valley | Stark     |                              |                        | Billings  | Dunn         | Golden Valley | Stark        | Across Region |
| River Flood              | 44                                      | 155        | 46            | 26        | 160                          | 5.52 days              | 10.3%   | 13.8%        | 10.3%         | 6.9%         | 13.8%         |
| Areal Flood*             | 26                                      | 45         | 36            | 29        | 4 (note1)                    | 0.14 days              | 3.4%  | 13.8%        | 6.9%          | 6.9%         | 13.8%         |
| Flash Flood              | 3                                       | 4          | 2             | 4         | 11                           | 0.38 days              | 10.3%   | 13.8%        | 6.9%          | 13.8%        | 27.6%         |
| <b>Total</b>             | <b>47</b>                               | <b>163</b> | <b>48</b>     | <b>43</b> | <b>175</b>                   | <b>6.03 days</b>       | <b>20.7%</b>  | <b>27.6%</b> | <b>20.7%</b>  | <b>24.1%</b> | <b>58.6%</b>  |

\*Areal Floods were concurrent with River Floods on all but four days.

**Source: National Climatic Data Center Storm Events Database**

Discrete event days is the number of days with a recorded event in the region. Some events occurred in multiple counties, so the sum of county event days is greater than the number of discrete events. The annual probability (region) is the likelihood of an event occurring anywhere in the region, based on the 29-year sample. The average probability of an event day in any single county is based on the number of county event days. This gives a sense of the likelihood of annual occurrence for any given county.

## Vulnerabilities and Impacts

**Table 19** summarizes flood insurance claims by county beginning in 1980. No flood insurance claims are documented for Dunn County or Golden Valley County.

**Table 19. Flood Insurance Claims by County (1980-2024)**

| County          | Number of Claims | Dollar Amount | Last Claim |
|-----------------|------------------|---------------|------------|
| Billings County | 10               | \$99,156.70   | 2019       |
| Dunn County     | 0                | \$0.00        | NA         |
| Golden Valley   | 0                | \$0.00        | NA         |
| Stark County    | 12               | 74,915.19     | 2019       |

Source: National Flood Insurance Program

The following risks and impacts of flooding were identified by stakeholders at workshops conducted in April of 2025.

### Billings County

The biggest risk is a flood that impacts the City of Medora. As North Dakota’s top tourist destination, Medora is defined by its historic character. Many structures have high cultural and economic value, and several are included on the National Register of Historic Places. Approximately half of the city lies within the 100-year floodplain of the Little Missouri River (**Table 20**). The Ferris General Store, Cowboy Hall of Fame, and De Mores Memorial Park are located within the 100-year floodplain, as are many homes and lodging areas. Two sewer lagoon cells are located within the 100-year floodplain. In addition, Medora has interstate access via one route, the I-94 Business Route/Pacific Avenue, a portion of which is located within the floodplain. A major flood event would severely restrict access to

the community. The worst-case scenario is if a major flood were to occur during peak tourism season (June to August). Outside of Medora, the Bully Pulpit Golf Course is a major attraction that was recently named the top public golf course in the nation by the USA Today’s Readers Choice Awards. A portion of the golf course is within the floodplain. Another potential impact identified by the community is the loss of livestock/stranded cattle.



*The City of Medora contains several historic structures and cultural buildings that are located within the Little Missouri River floodplain.*

**Image Credit: Theodore Roosevelt Presidential Library Foundation**

## Dunn County

The most common impact of flooding in the county is inundated roads. Flood events in 2008, 2009, and 2023 caused significant damage to roads. Box culverts have been constructed at many impacted sites to improve drainage, which has reduced the frequency and impact of flooding. FIRMs are established for Dunn Center, Dodge, Halliday, and Killdeer. Most of the development within these communities is located outside of the floodplain.

## Golden Valley County

The most common impact of flooding in the county is inundated roads. For example, the access road to the landfill in Beach was rebuilt three times in the past few years following washouts. FIRMs were created for the City of Beach in 1986. These maps indicate 19 properties within the 100-year floodplain, including several homes and businesses between 1<sup>st</sup> Street NE and 2<sup>nd</sup> Street NE. The at-grade railroad crossings on Centennial Avenue and 2<sup>nd</sup> Avenue NE are located within the floodplain. A large flood would impact the city's business district, ambulance and emergency services, and core infrastructure. High water has overtopped bridge crossings in the past, but no major flooding has occurred. Likewise, neither Golva nor Sentinel Butte has experienced localized flooding in recent history. FIRMs have not been established for these communities.

## Stark County

The most common impacts in the county are inundation and washouts of roads, pipes, and bridges. Stark County completed a county-wide Flood Insurance Study in 2019. FIRMs from this study were adopted in 2022 and 2024. The communities most at risk of flooding are Belfield and Dickinson, the two largest cities in Stark County.

Belfield has experienced localized flooding several times since 1996. There are 19 properties within the floodway/100-year floodplain, primarily residences. In addition, most of the industrial area located south of the Upper Heart River and east of US Highway 85 is within the floodplain. This area is within the city's ETA.

In Dickinson, there are 207 properties within the floodway/floodplain, including four manufactured home parks, many single-family residences, several commercial properties just south of the I-94/ND 22 interchange, and an industrial area just north of the I-94 Business Route/E Villard Street between 8<sup>th</sup> Avenue E and 10<sup>th</sup> Avenue E.

The remaining communities in Stark County – Gladstone, Richardton, South Heart, and Taylor – have few or no developed properties within the floodplain. Overland flooding in South Heart would primarily impact the golf course. In addition, South Heart would be substantially impacted by any closure of South Heart Road/121<sup>st</sup> Avenue W, which is the primary connection to Old Highway 10 and I-94.

## Critical Facilities

Chapter 2 summarizes critical facilities in the study area. Flooding can impact critical facilities, including transportation infrastructure, water treatment systems, and critical buildings. In Dickinson, flash flooding has made the Highway 22 underpass impassable at times. Improving the underpass has been a critical goal for the city for many years, and it is currently working on improvements to resolve the issue. If flooding were to damage a school, hospital, government building, or public safety facility, critical services could be disrupted for an extended period and services could ultimately be forced to relocate.

**Table 20. Address Points in Flood Hazard Zones**

| Area                      | Regulatory Floodway |             | 1% Annual Chance Flood Zone |             | 0.2% Annual Chance Flood Zone |             | All Flood Hazard Zones |             |
|---------------------------|---------------------|-------------|-----------------------------|-------------|-------------------------------|-------------|------------------------|-------------|
|                           | Count               | Percent     | Count                       | Percent     | Count                         | Percent     | Count                  | Percent     |
| Rural Stark County        | 5                   | 0.2%        | 67                          | 2.1%        | 30                            | 1.0%        | 102                    | 3.2%        |
| Belfield                  | 4                   | 0.7%        | 15                          | 2.7%        | 70                            | 12.5%       | 89                     | 15.8%       |
| Dickinson                 | 19                  | 0.2%        | 188                         | 1.8%        | 182                           | 1.8%        | 389                    | 3.8%        |
| Gladstone                 | 0                   | 0.0%        | 3                           | 1.5%        | 1                             | 0.5%        | 4                      | 2.0%        |
| Richardton                | 0                   | 0.0%        | 0                           | 0.0%        | 0                             | 0.0%        | 0                      | 0.0%        |
| South Heart               | 0                   | 0.0%        | 6                           | 1.9%        | 0                             | 0.0%        | 6                      | 1.9%        |
| Taylor                    | 0                   | 0.0%        | 0                           | 0.0%        | 0                             | 0.0%        | 0                      | 0.0%        |
| <b>Stark County Total</b> | <b>28</b>           | <b>0.2%</b> | <b>279</b>                  | <b>1.9%</b> | <b>283</b>                    | <b>1.9%</b> | <b>590</b>             | <b>3.9%</b> |
| Medora (Billings)         | 0                   | 0.0%        | 95                          | 50.8%       | 48                            | 25.7%       | 143                    | 76.5%       |
| Dodge (Dunn)*             | 0                   | 0.0%        | 0                           | 0.0%        | 0                             | 0.0%        | 0                      | 0.0%        |
| Dunn Center (Dunn)*       | 0                   | 0.6%        | 1                           | 0.0%        | 1                             | 0.6%        | 2                      | 1.3         |
| Halliday (Dunn)*          | 0                   | 0.0%        | 10                          | 4.8%        | 7                             | 3.4%        | 17                     | 8.2%        |
| Killdeer (Dunn)           | 0                   | 0.0%        | 4                           | 0.5%        | 0                             | 0           | 4                      | 0.5%        |
| Beach (Golden Valley)*    | 0                   | 0.0%        | 19                          | 2.6%        | 7                             | 0.9%        | 26                     | 3.9%        |

\*The numbers provided for Dodge, Dunn Center, and Halliday are estimates derived from images of floodplain maps that were georeferenced in GIS. Geospatial floodplain data for these communities was not available for analysis.

## Future Conditions

In general, no primary growth areas are impacted by a floodplain. Local jurisdictions with floodplain ordinances steer development away from floodplains or require other mitigation such as elevation on fill. Future development increases impervious surface coverage, which increases the risk of flash flooding. However, stormwater management systems are designed to mitigate this issue.

Future climate conditions are expected to produce increased precipitation across North Dakota, with winter and early spring precipitation expected to see the greatest increase, along with an increased risk of rainfall occurring during the traditional spring snowmelt period. In addition to increased precipitation during the cool/cold season, the number of days with strong thunderstorms and heavy rainfall is expected to increase by mid-century, especially in the eastern half of the state. Increased rainfall rates typically result in increased runoff rates and an increase in flash flooding, overland flooding, and/or riverine flooding in any season. However, rain occurring when the ground is frozen produces even more and faster runoff and is most likely to exacerbate the flood threat.

### Risk Perception





Workshop participants perceived that floods are **likely (3.05)** and that future impacts would be **moderate (3.28)**.

# 2025

Multi-Hazard Mitigation  
**PLAN**

Figure 11

## Flood Zones (Beach)

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee
-  City Boundary

Source: National Flood Hazard Layer

0 0.2 0.4  
Miles



# 2025 Multi-Hazard Mitigation PLAN



Figure 12

## Flood Zones (Belfield)

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee
-  Railroad
-  City Boundary

Source: National Flood Hazard Layer

0 0.1 0.2 0.3  
Miles



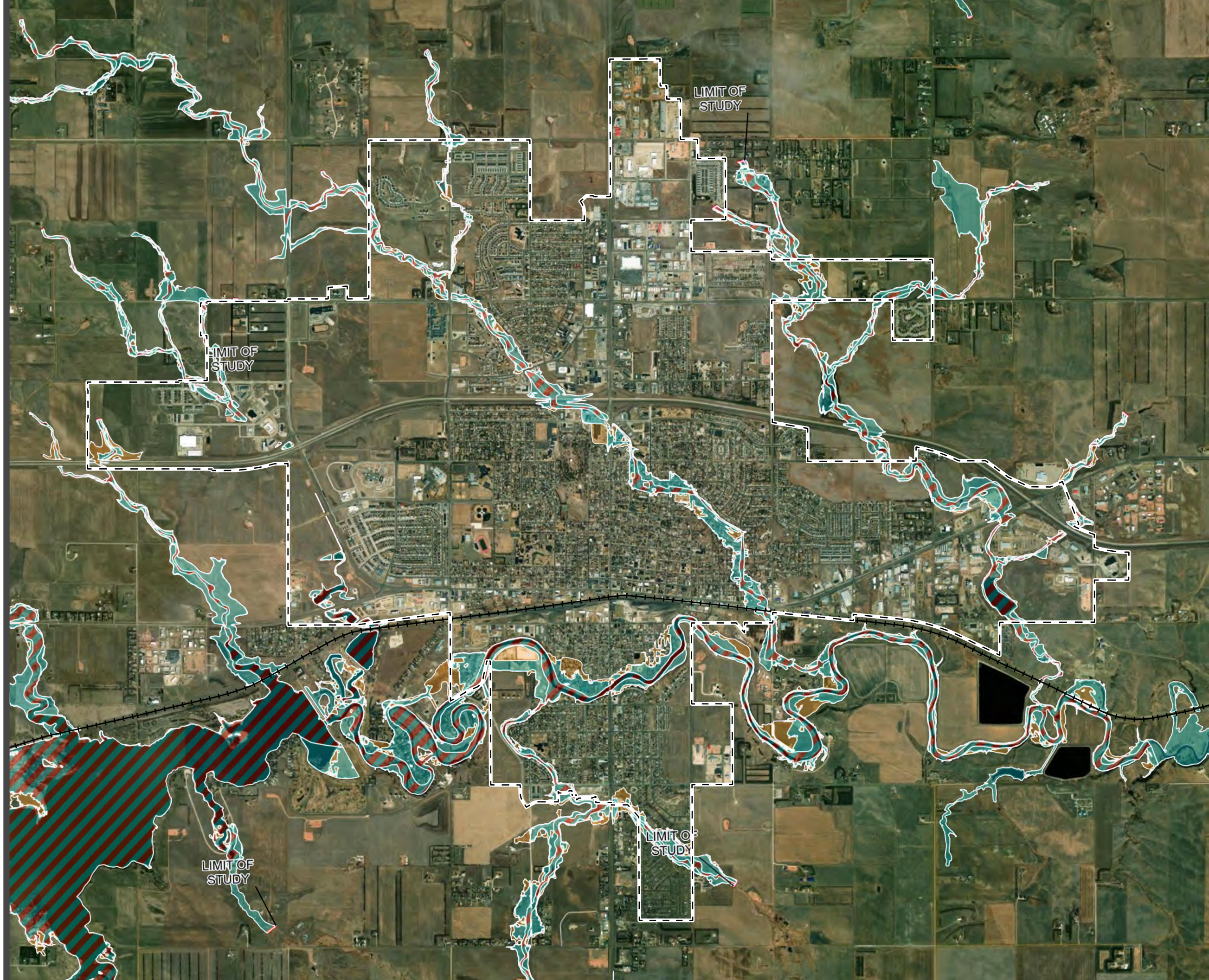
# 2025 Multi-Hazard Mitigation PLAN

Figure 13

## Flood Zones (Dickinson)

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee
-  Railroad
-  City Boundary

Source: National Flood Hazard Layer



# 2025 Multi-Hazard Mitigation PLAN



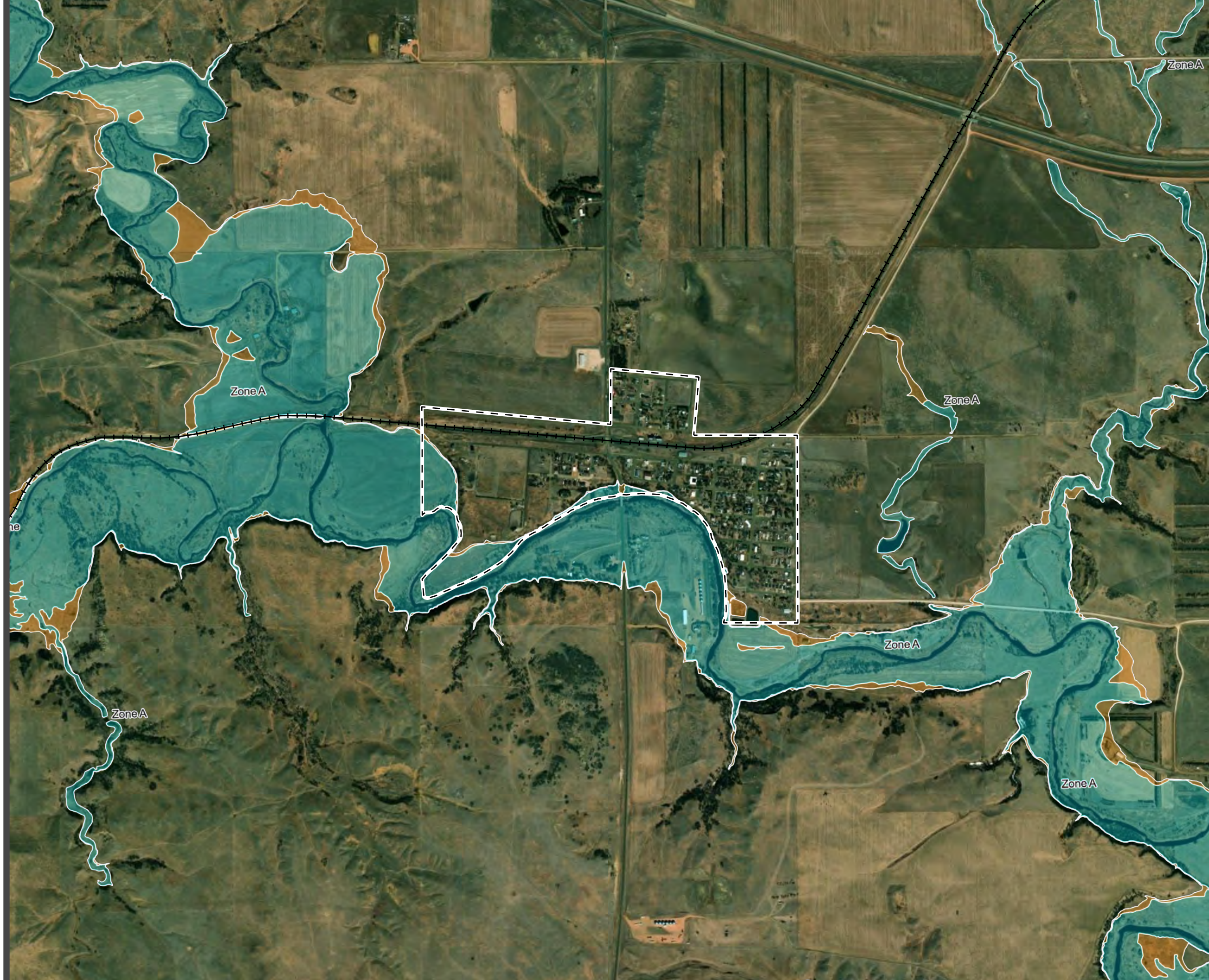
Figure 14

## Flood Zones (Gladstone)

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee
-  +++ Railroad
-  - - - City Boundary

Source: National Flood Hazard Layer

0 0.1 0.2 0.3  
Miles



# 2025

Multi-Hazard Mitigation

# PLAN

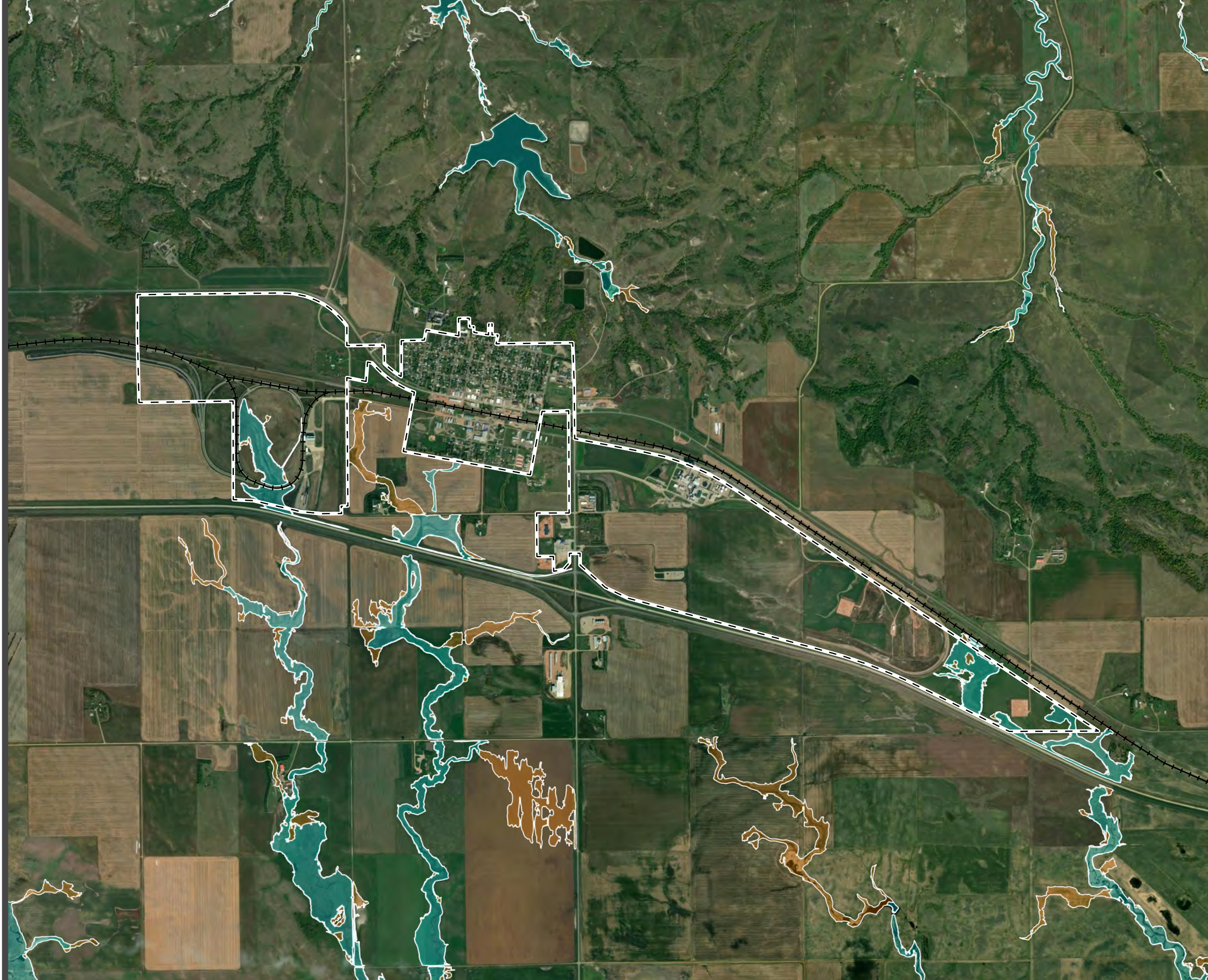
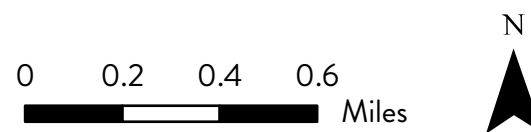


Figure 15

## Flood Zones (Richardton)

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee
-  Railroad
-  City Boundary

Source: National Flood Hazard Layer



# 2025

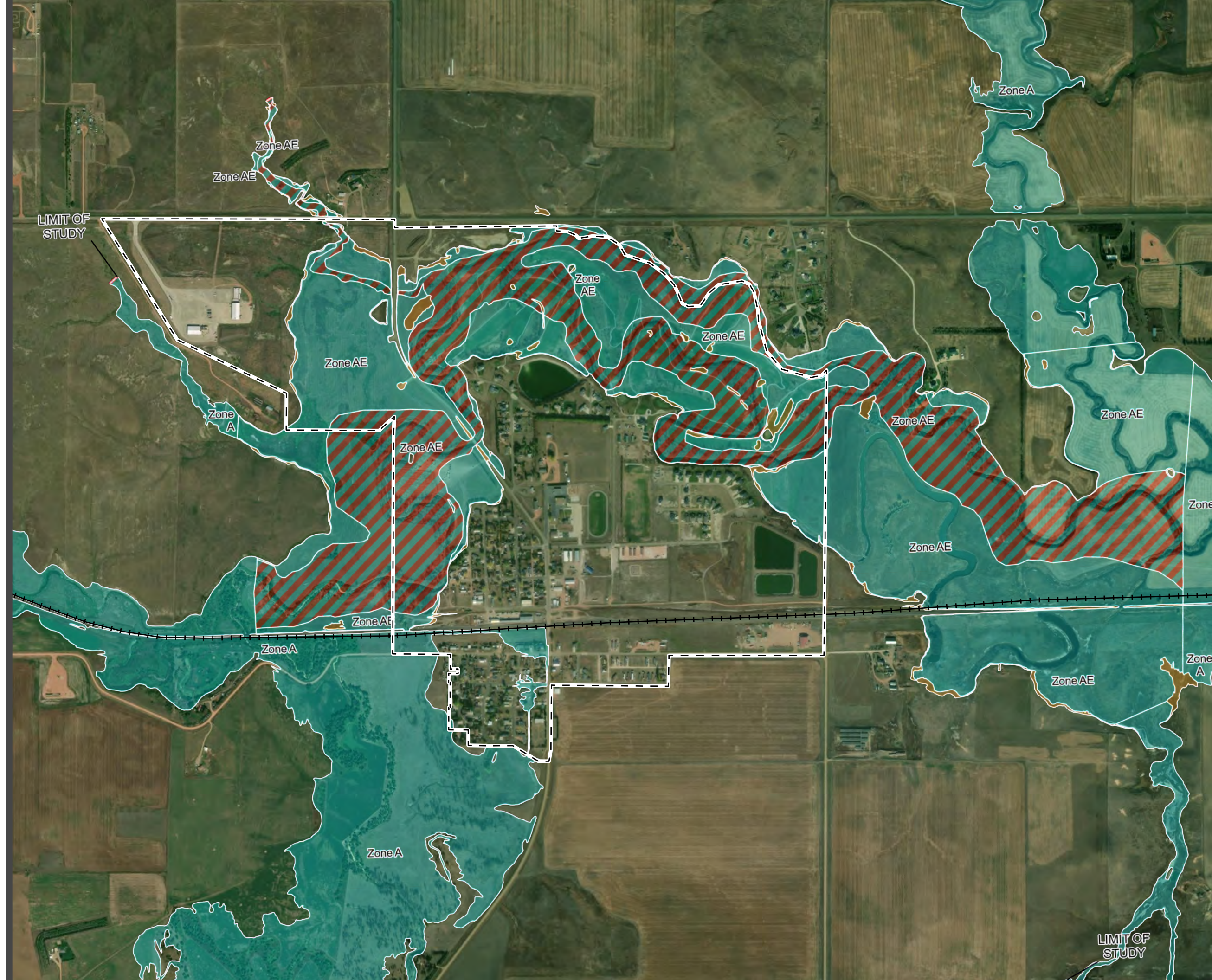
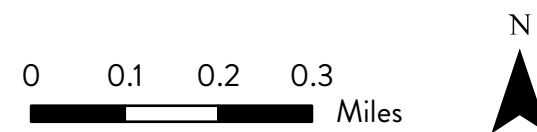
Multi-Hazard Mitigation  
**PLAN**

Figure 16

## Flood Zones (South Heart)

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee
-  Railroad
-  City Boundary

Source: National Flood Hazard Layer



# 2025 Multi-Hazard Mitigation PLAN



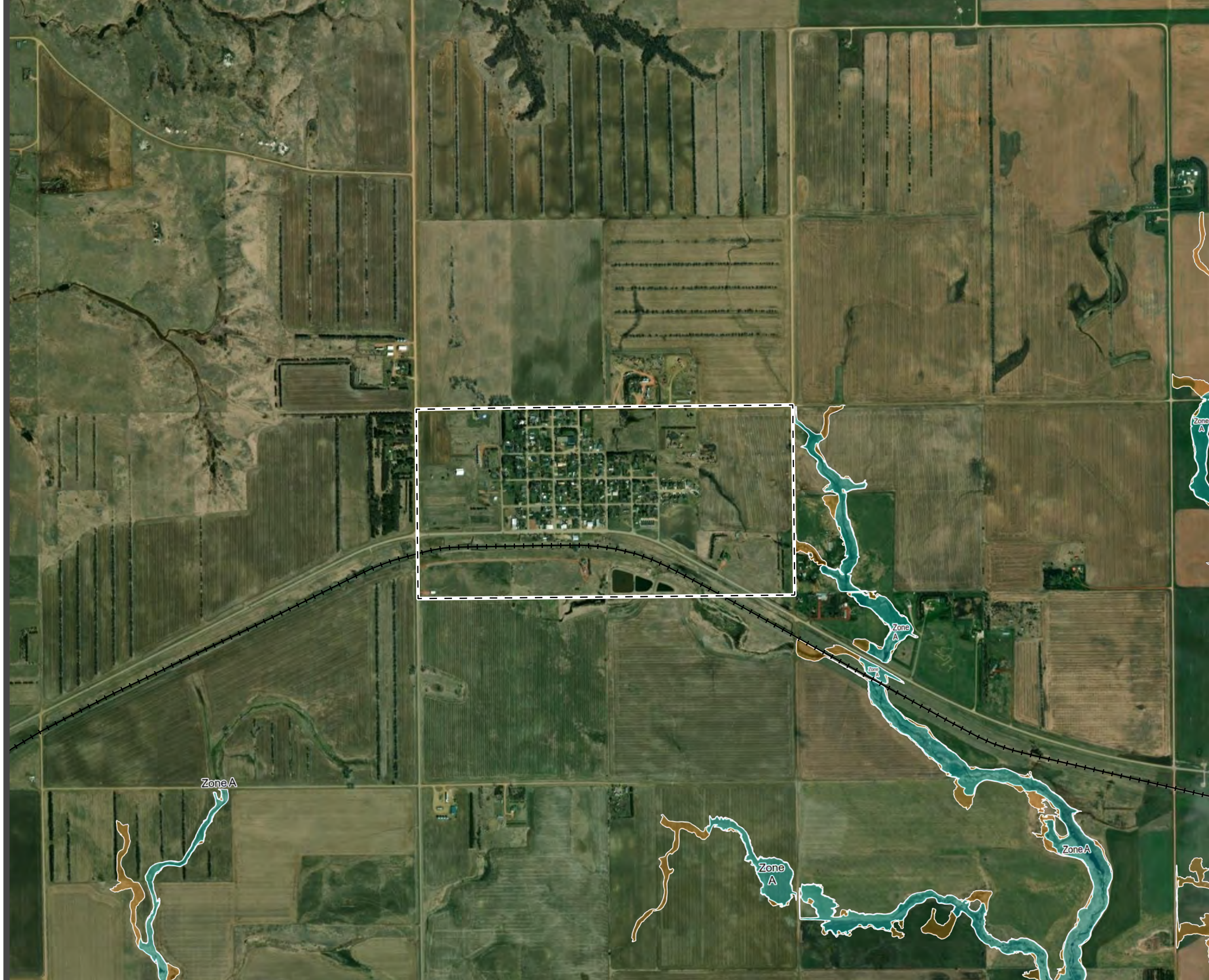
Figure 17

## Flood Zones (Taylor)

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee
-  Railroad
-  City Boundary

Source: National Flood Hazard Layer

0 0.1 0.2 0.3  
Miles







# 2025

Multi-Hazard Mitigation  
**PLAN**



Figure 18

## Flood Zones (Medora)

-  1.0% Annual Flood
-  0.2% Annual Flood
-  City Boundary
-  Railroad

Source: Billings County

0 0.1 0.2  
Miles











# 2025

Multi-Hazard Mitigation  
**PLAN**





Figure 19

## Flood Zones (Killdeer)

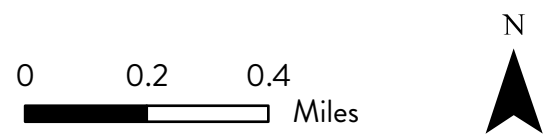
Effective December 7, 2017

-  1% Annual Chance Flood Hazard
-  Regulatory Floodway
-  Special Floodway
-  Area of Undetermined Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  Future Conditions 1% Annual Chance Flood Hazard
-  Area with Reduced Risk Due to Levee
-  Area with Risk Due to Levee

Effective April 17, 1989

-  Regulatory Floodway
-  1% Chance Annual Flood Hazard
-  0.2% Annual Chance Flood Hazard
-  City Boundary

Source: National Flood Hazard Layer; Dunn County



# 2025




Multi-Hazard Mitigation

# PLAN



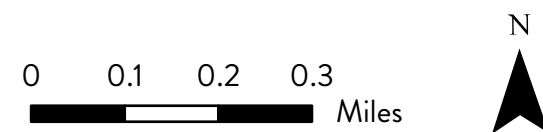
Figure 20

## Flood Zones (Dodge)

-  1.0% Chance Annual Flood Hazard
-  0.2% Chance Annual Flood Hazard
-  City Boundary



Source: FEMA Flood Map Service Center






# 2025 Multi-Hazard Mitigation PLAN



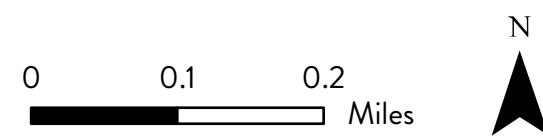
Figure 21

## Flood Zones (Dunn Center)

-  1.0% Chance Annual Flood Hazard
-  0.2% Chance Annual Flood Hazard
-  City Boundary



Source: FEMA Flood Map Service Center



# 2025




Multi-Hazard Mitigation

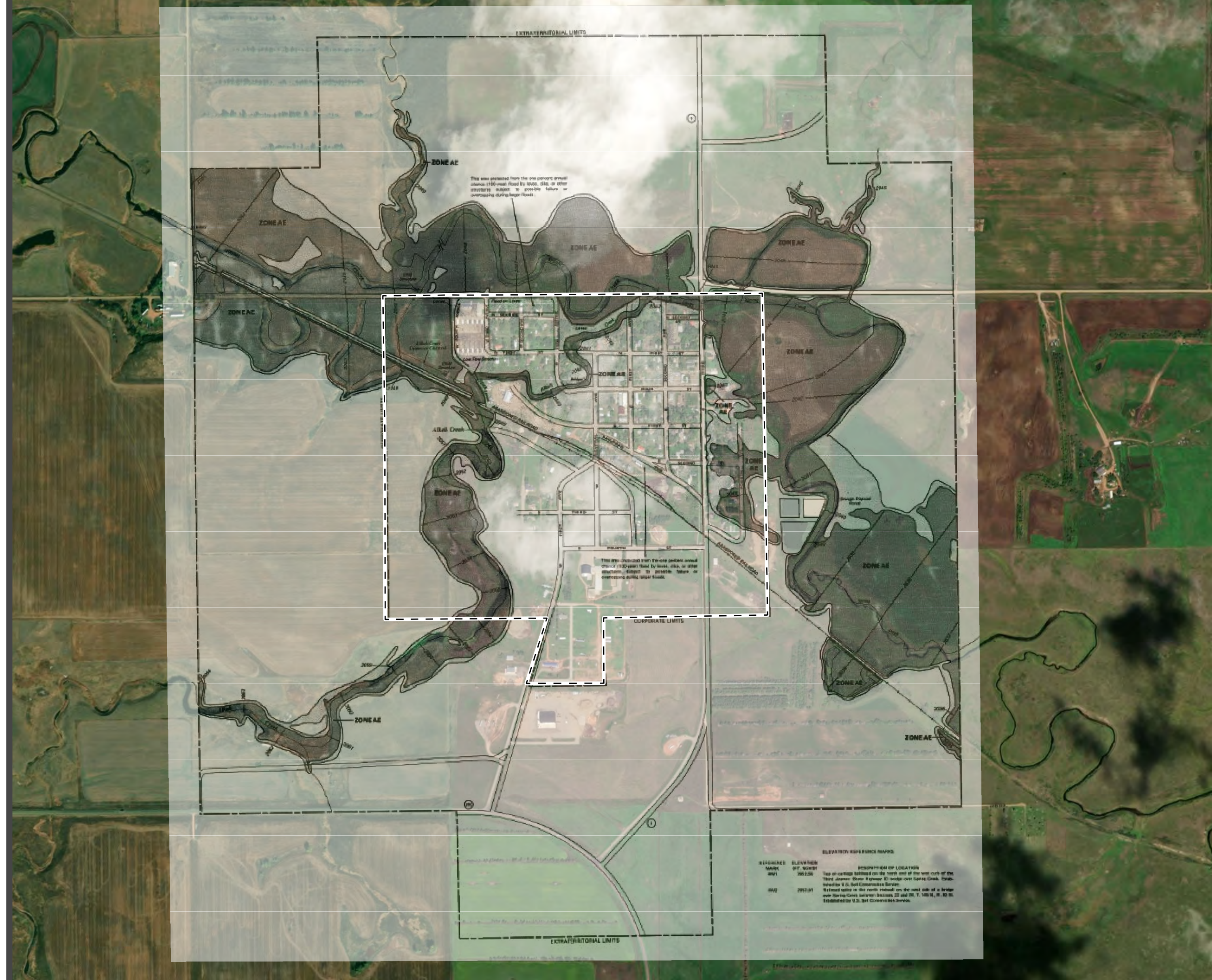
# PLAN



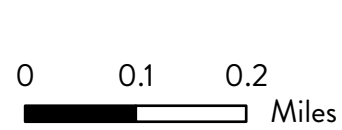
Figure 22

## Flood Zones (Halliday)

-  1.0% Chance Annual Flood Hazard
-  0.2% Chance Annual Flood Hazard
-  City Boundary



Source: FEMA Flood Map Service Center



ELEVATION REFERENCE MAPS

| REFERENCE MARK | ELEVATION (FT. NGVD) | DESCRIPTION OF LOCATION   |
|----------------|----------------------|---|
| MM1            | 285.258              | Top of carriage posthead on the north end of the west curb of the Third Avenue (Bourbon Highway) bridge over Spring Creek. Established by U.S. Soil Conservation Service.       |
| MM2            | 282.041              | North end of the north abutment on the north side of a bridge over Spring Creek, between Sections 22 and 26, T. 14S R. 2E, 82 W. Established by U.S. Soil Conservation Service. |

# GEOLOGIC HAZARDS

## Overview

- **Overall Risk:** Low
- **Probability:** Possible. The probability of a significant earthquake is low. Portions of Billings, Dunn, and Golden Valley Counties are within areas that are moderately susceptible to landslides.
- **Primary Impacts:** Agricultural loss (crops/livestock); impacts to pipelines and transport facilities; human loss and injuries; power loss; property damage
- **Related Hazards:** Hazardous Materials Release

Geologic hazards include avalanches, landslides, earthquakes, radon, expansive soils, erosion, sinkholes, and volcanic eruptions.

An **avalanche** is the rapid movement of snow, ice, rock, and debris down a slope from the flank of a volcano or mountain. According to the US Geological Survey (USGS), avalanches are a widespread natural hazard to humans and infrastructure as well as an important landscape disturbance affecting mountain ecosystems.



A **landslide** is defined by USGS as a movement of rock, soil, artificial fill, or a combination thereof on a slope in a downward or outward direction.

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

**Radon** is a colorless, odorless, radioactive gas that is naturally formed from the breakdown of uranium, thorium, and radium in the earth's rocks, soil, and groundwater. The gas can accumulate inside buildings and is a serious health risk that has been linked to lung cancer.

**Expansive soils** are clay-rich soils that swell when wet and shrink when dry, causing significant damage to structures due to their large volume changes. This "shrink-swell" behavior can lead to problems like cracked foundations, uneven floors, and warped walls.

**Erosion** is the process where natural forces such as water, wind, and gravity wear away and move rock, soil, and sediment from one location to another. Erosion can cause damage to transportation infrastructure such as roads and bridges.

A **sinkhole** is a depression in the ground that has no natural external surface drainage. The primary cause of sinkholes is typically the dissolution of soluble rock by groundwater. This creates underground spaces, which may cause sudden land subsidence.

A **volcanic eruption** is the expulsion of gases, rock fragments, steam, and lava erupt onto the earth's surface. Volcanic eruptions can last days, months, or even years.

## Location

### Avalanches

This hazard is usually not applicable to North Dakota, due to the generally low to mid-relief nature of the terrain, low to moderate levels of snow accumulation, and low incidence of a damaging collapse of snow down a mountainside.

### Landslides

Landslides are common occurrences within the study area. Most have occurred in areas with relatively steep river valleys or within Badlands

topography, particularly within Billings County and northern Dunn County.

The North Dakota Geological Survey recently mapped landslide locations in the state. **Figure 23** shows landslides that have occurred in the four-county area. Some of the landslide areas are complexes containing multiple landslides. **Table 21** summarizes landslide occurrences within each county. **Figure 24** maps landslide susceptibility for the region. The spatial datasets are helpful for identifying structures and facilities that may be vulnerable to landslides.

**Table 21. Historical Landslide Occurrences**

| County        | Landslide Areas | County Area (sq. miles) | Percent |
|---------------|-----------------|-------------------------|---------|
| Billings      | 7,148           | 47.0                    | 4.1%    |
| Golden Valley | 1,982           | 11.8                    | 1.8%    |
| Dunn          | 8,303           | 106.0                   | 5.1%    |
| Stark         | 840             | 4.2                     | 0.3%    |

In 2011, landslides occurred in Dunn County along Highway 22 approximately 20 miles north of Killdeer and along Highway 8 near Twin Buttes. In 2013, a landslide occurred in Sentinel Butte that limited access but did not damage any buildings. In 2019, South Heart experienced slumping into the river following severe flooding, but no buildings were damaged. Also in 2019, a landslide in Theodore Roosevelt National Park north of Medora impacted a six-mile stretch of the scenic loop drive. In 2025, this roadway section remains closed for repairs.

### Earthquakes

The entire state of North Dakota has a low risk of earthquakes. According to the USGS, the chance of a potentially damaging

earthquake occurring anywhere in the state over the next 50 years is less than 2 percent.

Historically, of the 13 earthquakes determined to have occurred within North Dakota, two had their epicenter in the four-county area. In 1927, a 3.2 magnitude earthquake occurred in Stark County, just west of Hebron. In 2009, a 1.9 magnitude earthquake occurred in Fort Berthold Reservation within Dunn County.



*Part of the Scenic Drive Loop in the Theodore Roosevelt National Park South Unit collapsed in 2019. Crews have been working since 2022 to repair the six-mile stretch of road. **Image Credit: Bismarck Tribune***

## Radon

Radon is the most common geological hazard sub-type in soils across North Dakota, though exposure at any one location and soil depth can vary from location to location. According to USGS, all counties within the study area fall within Radon Zones that have the highest potential for the gas. Counties have a predicted average indoor screening level that is greater than 4 picocuries per liter (pCi/L).

## Expansive Soils

Expansive soils are a very common hazard across the entire state. Clay loam and silt loam are found in all four counties of the study area as this area is part of the Belfield-Daglum complex, a common soil classification in the Northern Great Plains. This soil classification features mixtures of Belfield soils (Clayey Glossic Natrustolls) and Daglum soils (Claypan Vertic Nastrustolls), known for their clayey textures, moderate drainage, and characteristics like high sodium.

## Sinkholes

There are 277 abandoned mine lands (AMLs) in the four-county area (**Figure 23**). Underground mining has led to sinkholes in other parts of North Dakota, but there has been only one documented sinkhole at an AML in the four-county area. Using LiDAR elevation data and historical aerial photographs, the NDGS study notes that no collapse features from underground voids were visible on the surface of any AML in the region. However, uncollapsed mine voids may have occurred in the subsurface beyond the boundaries of the AMLs.

## Volcanos

There are no known areas in the study area with potential for volcanic eruption. However, if the Yellowstone Caldera were to erupt the impacts would likely reach this region.

## Probability and Extent

### Avalanches

There are no recorded cases of avalanches in the study area and according to the USGS the hazard is usually not applicable to North Dakota due to the state's terrain and wintertime snow accumulations. The extent of avalanches is expressed using the relative-size scale (R-scale), which is based on factors like volume, length, and destructive power. Another way to classify avalanches is via the destructive force scale (D-scale), which is based on destructive potential (mass, speed, and density).

### Landslides

Landslides occur frequently within the study area. However, most occur in undeveloped areas and do not impact buildings or infrastructure. About 90 percent of the landslides that have occurred in the study area are smaller than 10 acres, according to the NDGS study. The extent for a landslide is identified via prevalent areas (**Figure 24**). These areas are primarily based on geological factors and steepness of slope and include active and inactive landslides. The USGS uses a similar process nationwide and has developed an 8-point, 5-category "confidence" scale for landslide susceptibility. For the four-county study area, there are areas within each county that are rated as "High confidence in extent or nature of landslide (8)", although the counties of Billings, Dunn, and Golden Valley have significantly more landslide areas than Stark County. Landslide susceptibility in each county varies from a level of 1 (low susceptibility) to 5 (high susceptibility) (**Table 24**).

### Earthquakes

There have been two recorded earthquakes in the study area since 1927 and according to the USGS the probability of a significant-

earthquake in the four-county area is very low. The extent of an earthquake is measured using the Richter Scale (**Table 22**) and the Modified Mercalli Intensity Scale (**Table 23**). The magnitude of an earthquake is based on intensity measured at the source while the intensity of an earthquake is based on the disturbance felt at affected locations.

**Table 22. Understanding the Richter Scale**

| Richter Magnitude | Feels like KG of TNT | Notes  |
|-------------------|----------------------|--|
| 0-1               | 0.6-20 kg            | We cannot feel these.  |
| 2                 | 600 kg               | Smallest quake people can normally feel.   |
| 3                 | 20,000 kg            | People near the epicenter feel this quake.   |
| 4                 | 60,000 kg            | Causes damage around the epicenter. It is the same as a small fission bomb.                                |
| 5                 | 20 million kg        | Damage done to weak buildings in the area of the epicenter.  |
| 6                 | 60 million kg        | Can cause great damage around epicenter.   |
| 7                 | 20 billion kg        | Creates enough energy to heat NYC for one year. Can be detected all over the world. Causes serious damage. |
| 8                 | 60 billion kg        | Causes death and major destruction. Destroyed San Francisco in 1906.                                       |
| 9                 | 20 trillion kg       | Rare, but would cause unbelievable damage.   |

Source: Richter Scale (SMS-Tsunami Warning.com, 2024).

**Table 23. Modified Mercalli Intensity Scale**

| Intensity | Shaking     | Description / Damage  |
|-----------|-------------|---|
| I         | Not felt    | Not felt except by a few under especially favorable conditions.   |
| II        | Weak        | Felt by a few persons at rest, especially on upper floors of buildings.   |
| III       | Weak        | Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to passing of a truck. Duration estimated. |
| IV        | Light       | Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.          |
| V         | Moderate    | Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.   |
| VI        | Strong      | Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.   |
| VII       | Very strong | Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.                             |

| Intensity | Shaking | Description / Damage   |
|-----------|---------|--|
| VIII      | Severe  | Damage slight in specially designed structures, considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. |
| IX        | Violent | Damage considerable in specially designed structures; well designed structures thrown out of plum. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.  |
| X         | Extreme | Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.   |

Source: Modified Mercalli Intensity Scale (USGS, n.d.)

## Radon

Radon is a frequent hazard faced by homeowners with basements in the study area. According to the Environmental Protection Agency’s (EPA) Map of Radon Zones for North Dakota, all counties within the study area have been identified as having the highest potential for having indoor radon levels above 4 pCi/L which is considered hazardous to human health (**Figure 25**). The extent of radon is measured in picocuries per liter which is one-trillionth of a curie (a unit of radioactivity). There is no known safe level. **Table 26** shows the zone and level of radon for each jurisdiction in the study area.

## Expansive Soils

There is a very likely probability of expansive soils in the study area. The extent of expansive soils is expressed as a characteristic of the relative clay-mineral content in the soil. In engineering and agricultural applications this may be the Shrink-Swell Class, a Linear Extensibility Percent (LE/LEP), or a Coefficient of Linear Extensibility (CL/COLE) (**Table 24**). Expansive / contractive soils can produce soil heaving/cracking during protracted wet/dry conditions. Cracking soils can break critical plant root structures leading to crop failure. Additionally, Bridges, roadbeds, building foundations, and pipelines can fail due to the heaving, settling, or cracking of soils. **Table 27** identifies if expansive soils are present in the study area jurisdictions as well as lists the Shrink-Swell Classes and LEPs found in each jurisdiction. **Figure 26** shows the location of these areas.

**Table 24. Shrink-Swell Class**

| Shrink-Swell Class | LEP | COLE      |
|--------------------|-----|-----------|
| Low                | <3  | <0.03     |
| Moderate           | 3-6 | 0.03-0.06 |
| High               | 6-9 | 0.06-0.09 |
| Very High          | ≥9  | ≥0.09     |

## Sinkholes

The probability of sinkholes is unlikely. The previous MHMP documented one instance of a sinkhole on abandoned mining lands. In Stark County, a sinkhole caused by the Binek Coal Mine impacted a resident’s yard. In addition, small sinkholes occasionally damage roadways. For example, in 2022, a sinkhole formed at the intersection of Fairway and 23 Avenue in Dickinson, prompting a partial roadway

closure. The extent of a sinkhole is measured through a combination of methods, including direct measurement of its surface diameter.

## Volcanos

The probability of a volcano occurring in the study area is virtually zero as there are no active volcanos in North Dakota nor does the state sit on a tectonically active boundary. The extent of a volcano is determined by measuring its physical size and eruption magnitude.



### Risk Perception



Workshop participants perceived that geologic hazards are **unlikely (2.09)** and that future impacts would be **minor (2.49)**.

**Table 25. Extent and Probability of Landslides**

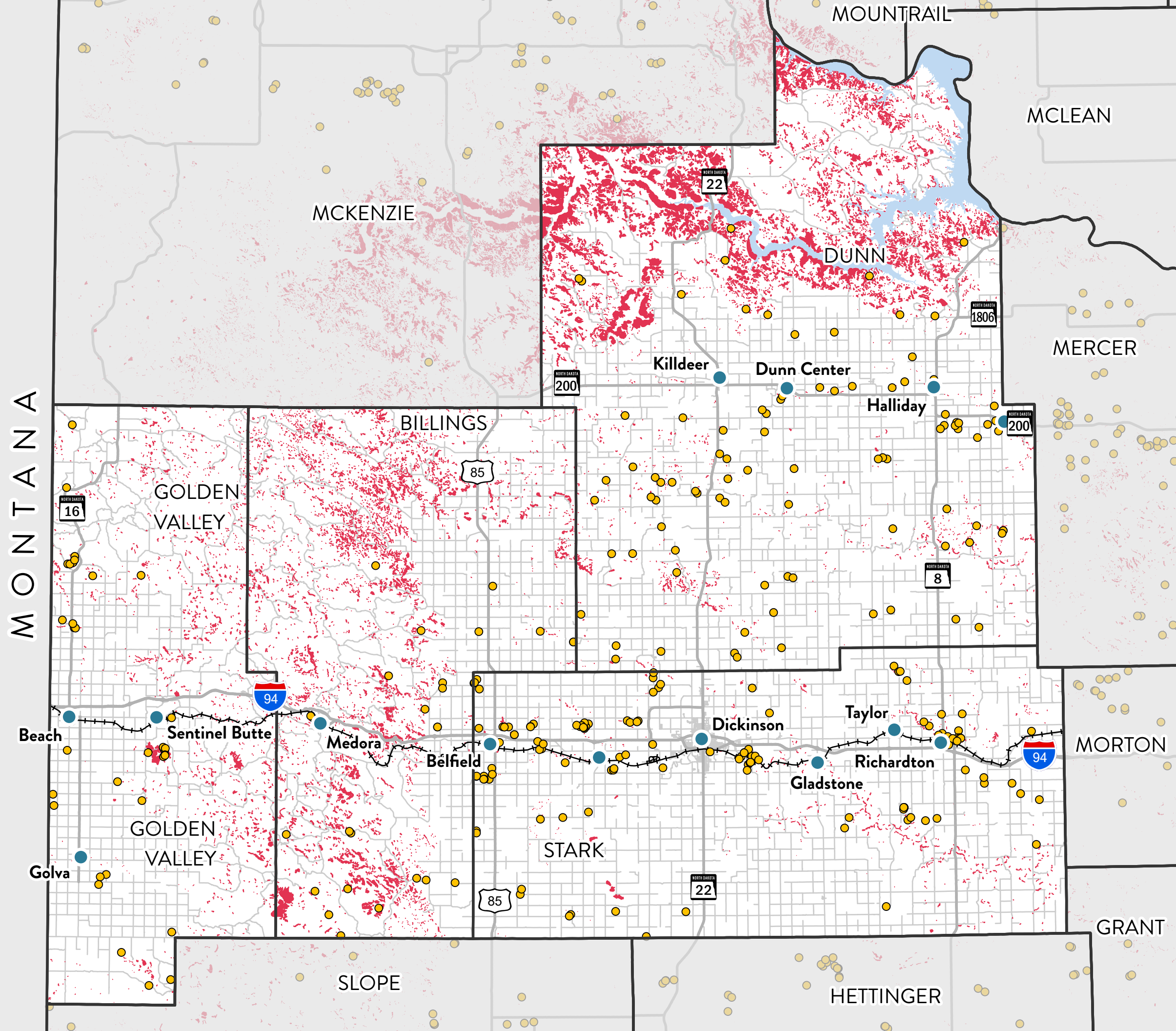
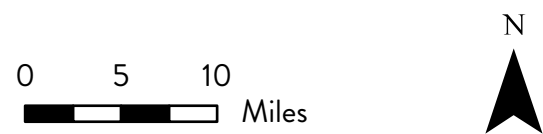
| Local Jurisdiction          | Presence of Nearby Landslide Points | Presence of Nearby Landslide Polygons | Presence of Nearby Landslide Susceptibility | Landslide Point Confidence | Landslide Polygon Confidence | Landslide Susceptibility Score |
|-----------------------------|-------------------------------------|---------------------------------------|---|----------------------------|------------------------------|--------------------------------|
| <b>BILLINGS COUNTY</b>      | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| Medora                      | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| <b>DUNN COUNTY</b>          | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| Dodge                       | -                                   | -                                     | ✓   | -                          | -                            | 1-2                            |
| Dunn Center                 | -                                   | -                                     | ✓   | -                          | -                            | 1-2                            |
| Halliday                    | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-4                            |
| Killdeer                    | -                                   | -                                     | ✓   | -                          | -                            | 1-5                            |
| <b>GOLDEN VALLEY COUNTY</b> | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| Beach                       | -                                   | -                                     | ✓   | -                          | -                            | 1-2                            |
| Golva                       | -                                   | -                                     | ✓   | -                          | -                            | 1-2                            |
| Sentinel Butte              | -                                   | -                                     | ✓   | -                          | -                            | 1-3                            |
| <b>STARK COUNTY</b>         | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| Belfield                    | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| Dickinson                   | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| Gladstone                   | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| Richardton                  | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-5                            |
| South Heart                 | -                                   | ✓                                     | ✓   | -                          | 8                            | 1-4                            |
| Taylor                      | -                                   | -                                     | -   | -                          | -                            | -                              |

Figure 23

## Historical Landslides and Abandoned Mines

-  Landslide
-  Abandoned Mine (277)

Source: North Dakota Geological Survey,  
North Dakota GIS Hub



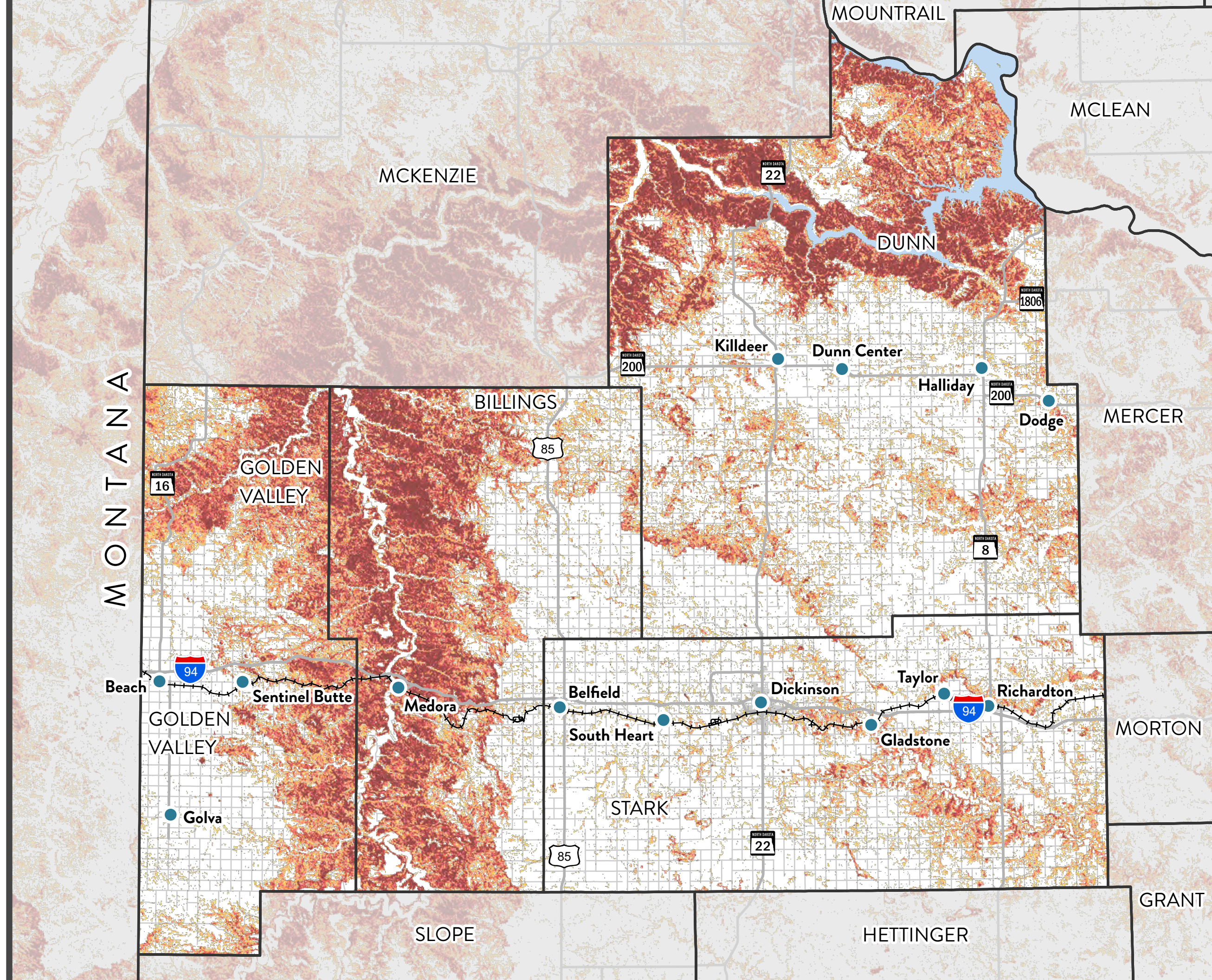
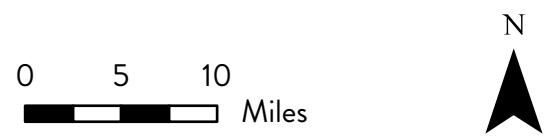
# 2025 Multi-Hazard Mitigation PLAN

Figure 24

## Landslide Risk



Source: United States Geological Survey



**Table 26. Extent and Probability of Radon**

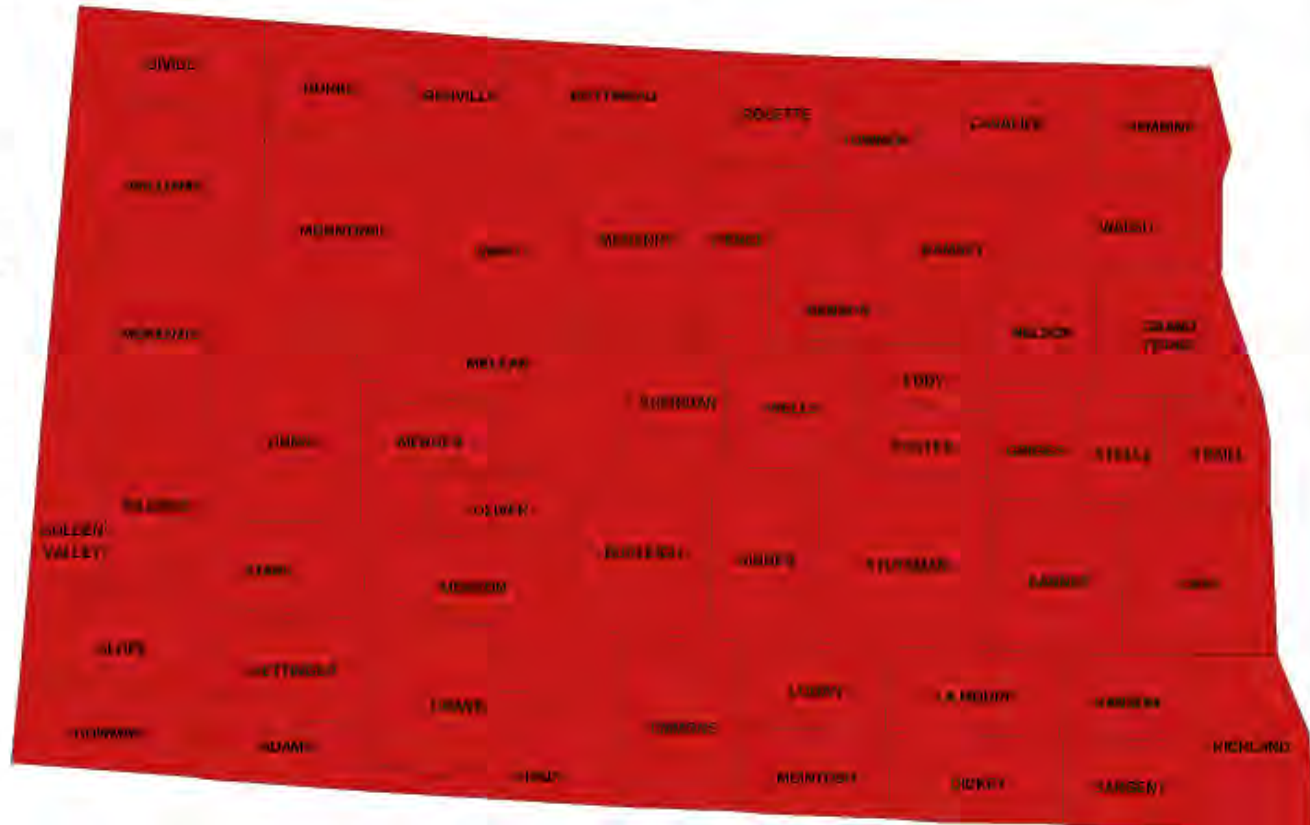
| Local Jurisdiction          | Presence of Radon | Radon Zone   | pCi/L Level | Description                 |
|-----------------------------|-------------------|--------------|-------------|-----------------------------|
| <b>BILLINGS COUNTY</b>      | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Medora                      | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| <b>DUNN COUNTY</b>          | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Dodge                       | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Dunn Center                 | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Halliday                    | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Killdeer                    | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| <b>GOLDEN VALLEY COUNTY</b> | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Beach                       | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Golva                       | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Sentinel Butte              | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| <b>STARK COUNTY</b>         | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Belfield                    | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Dickinson                   | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Gladstone                   | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Richardton                  | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| South Heart                 | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |
| Taylor                      | ✓                 | Zone 1 (Red) | > 4 pCi/L   | Highest Potential for Radon |

**Figure 25. North Dakota - EPA Map of Radon Zones**




The Map of Radon Zones was developed in 1993 to identify areas of the U.S. with the potential for elevated indoor radon levels. The map is intended to help governments and other organizations target risk reduction activities and resources. The Map of Radon Zones should not be used to determine if individual homes need to be tested. No matter where you live, test your home for radon—it's easy and inexpensive. Fix your home if your radon level is 4 picocuries per liter (pCi/L) (150 becquerels per meter cubed (Bq/m<sup>3</sup>)) or higher. Consider fixing if your level is between 2 and 4 pCi/L (75 - 150 Bq/m<sup>3</sup>).

The Map of Radon Zones was developed using data on indoor radon measurements, geology, aerial radioactivity, soil parameters, and foundation types. The EPA recommends that this map be supplemented with any available local data to further understand and predict the radon potential for a specific area.

**All homes should be tested, regardless of zone designation.**



What do the colors mean?

| Zone        | Zone 1 (red zones)   | Zone 2 (orange zones)   | Zone 3 (yellow zones)  |
|-------------|--|---|--|
| Color       |   |    |    |
| Description | <p><b>Highest potential</b></p> <p>Counties have a predicted average indoor screening level &gt; (Greater) than 4 pCi/L (picocuries per liter) (150 Bq/m<sup>3</sup> (becquerels per meter cubed))</p> | <p><b>Moderate potential</b></p> <p>Counties have a predicted average screening level ≥ (Greater than and equal to) 2 pCi/L (75 Bq/m<sup>3</sup>) and ≤ (less than and equal to) 4 pCi/L (150 Bq/m<sup>3</sup>)</p> | <p><b>Low potential</b></p> <p>Counties have a predicted average indoor screening level &lt; (Less than) 2 pCi/L (75 Bq/m<sup>3</sup>)</p> |

**IMPORTANT:** Consult the publication entitled "Preliminary Geologic Radon Potential Assessment of North Dakota" (USGS Open-file Report 93-292-H) before using this map. See <https://doi.org/10.3133/ofr93292H>. This document contains information on radon potential variations within counties. The EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.

**Table 27. Extent and Probability of Expansive Soils**

| Local Jurisdiction          | Presence of Geological Threat (Shrink-Swell) | LEP – Representative Value | Description                  |
|-----------------------------|--|----------------------------|------------------------------|
| <b>BILLINGS COUNTY</b>      | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Medora                      | ✓  | <3-9                       | Low, Moderate, and High Risk |
| <b>DUNN COUNTY</b>          | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Dodge                       | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Dunn Center                 | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Halliday                    | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Killdeer                    | ✓  | <3-9                       | Low, Moderate, and High Risk |
| <b>GOLDEN VALLEY COUNTY</b> | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Beach                       | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Golva                       | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Sentinel Butte              | ✓  | <3-9                       | Low, Moderate, and High Risk |
| <b>STARK COUNTY</b>         | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Belfield                    | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Dickinson                   | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Gladstone                   | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Richardton                  | ✓  | <3-9                       | Low, Moderate, and High Risk |
| South Heart                 | ✓  | <3-9                       | Low, Moderate, and High Risk |
| Taylor                      | ✓  | <3-9                       | Low, Moderate, and High Risk |

# 2025 Multi-Hazard Mitigation PLAN

Figure 26

## Geological Threat

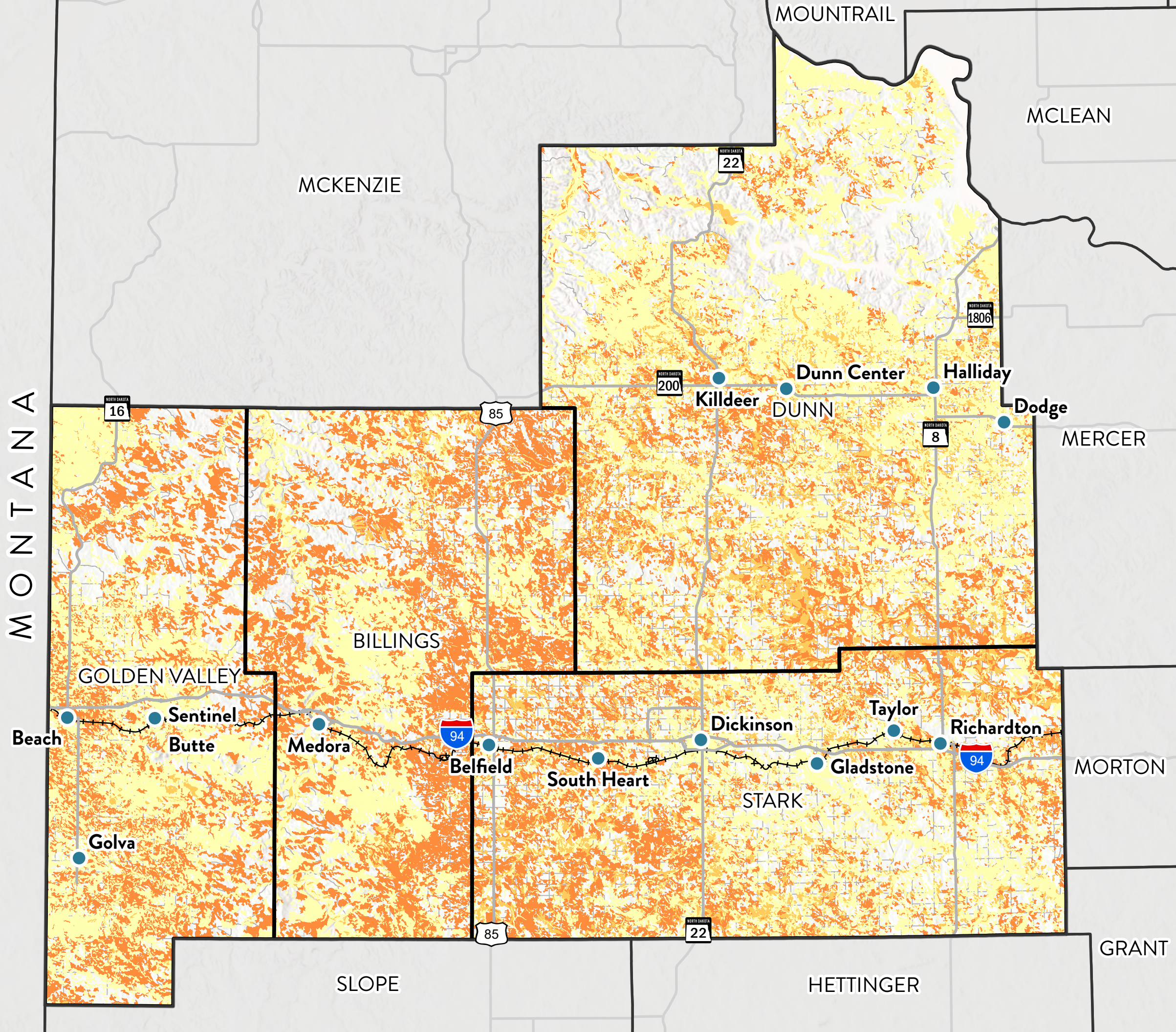
Shrink-Swell Class

LEP - Representative Value

- < 3 (Low)
- 3 - 6 (Moderate)
- 6 - 9 (High)
- > 9 (Very High)

Source: USDA

0 5 10  
Miles



## Vulnerabilities and Impacts

### Landslides

As recently as 2019, there have been landslides that have damaged major roadways in the four-county area. Hazardous liquid pipelines and gas transmission lines are located throughout the study area. While pipeline operators typically try to avoid routes that are susceptible to landslides, some pipelines could be at risk. In 2016, a landslide caused a rupture in the Belle Fourche Pipeline in Billings County, resulting in crude oil that contaminated Ash Coulee Creek.

**Table 28** summarizes structures, pipelines, and highways within areas that are highly susceptible to landslides. Structures were estimated using address points (parcel centroids) that were within 100 feet of a known landslide location. It is not known if any structures are vulnerable to landslides. In addition to state and federal highways, many local roads traverse areas where landslides have occurred.

**Table 28. Structures and Infrastructure Near Landslide Areas**

| County        | Structure Addresses | Hazardous Pipelines (Miles) | State/Federal Highways (Miles) |
|---------------|---------------------|-----------------------------|--------------------------------|
| Billings      | 15                  | 1.4                         | 3.0                            |
| Dunn          | 44                  | 12.7                        | 11.0                           |
| Golden Valley | 3                   | 1.0                         | 2.1                            |
| Stark         | 8                   | 0.0                         | 0.4                            |
| <b>Total</b>  | <b>70</b>           | <b>15.1</b>                 | <b>16.5</b>                    |

### Earthquakes

According to the USGS, an earthquake in the region would most likely only result in a light perceived shaking and no damages. There is no history of earthquakes in the four-county area causing structural damage. In the event of a significant earthquake, residents in very old homes and mobile/manufactured homes would be most vulnerable. According to the 2000 Decennial Census, an estimated 2,331 housing units in the region were built before 1940. The average household size is about 2.45 persons, according to the 2023 American Community Survey. Therefore, there are approximately 5,700 persons in the region living in homes that were built before 1940 (**Table 29**). In addition, there are approximately 1,850 mobile/manufactured homes in the study area, which house an estimated 4,525 residents (**Table 30**). Mobile homes gained popularity in the 1950s and 1960s, so these homes exclude the pre-1940 structures in Table 18. All told, it is estimated that over 10,000 residents would have enhanced vulnerability to an earthquake.

**Table 29. Pre-1940 Homes and Residents**

| County        | Pre-1940 Houses | Estimated Residents |
|---------------|-----------------|---------------------|
| Billings      | 110             | 268                 |
| Dunn          | 539             | 1,358               |
| Golden Valley | 410             | 975                 |
| Stark         | 1,272           | 3,103               |
| <b>Total</b>  | <b>2,331</b>    | <b>5,704</b>        |

Source: 2000 Census

**Table 30. Mobile/Manufactured Homes and Residents**

| County        | Mobile Homes | Mobile Home Residents |
|---------------|--------------|-----------------------|
| Billings      | 65           | 160                   |
| Dunn          | 543          | 1,330                 |
| Golden Valley | 18           | 44                    |
| Stark         | 1,221        | 2,991                 |
| <b>Total</b>  | <b>1,847</b> | <b>4,525</b>          |

Source: 2023 American Community Survey 5-Year Estimates

## Radon

There are 277 abandoned mines in the four-county area. Some residences may be at risk of sinkholes, but this is a historical rarity. Based on the EPA’s assessment of risk for radon in homes, radon in indoor air is estimated to cause about 21,000 cancer deaths each year in the United States. Smokers are at higher risk of developing radon-induced lung cancer. This type of lung-cancer typically develops 5-25 years after exposure. Testing is the only way to know the radon level of an exposed structure and both the EPA and U.S. Surgeon General recommend testing all homes below the third floor for radon. There is no data relating to the number of homes in North Dakota which are impacted by Radon each year.

## Expansive Soils

All jurisdictions contain mapped areas with low (0–3%), moderate (3–6%), and high (6–9%) Linear Extensibility Percent (LEP) values, indicating the presence of shrink-swell soils across each area. As a result, each jurisdiction is vulnerable to expansive soil conditions,

though the degree of risk varies depending on the proportion and location of moderate and high LEP classifications.

### Low LEP Areas (0-3%)

Areas with predominantly low LEP soils have limited shrink-swell potential. While these soils can still experience minor seasonal volume changes due to moisture fluctuations, the overall vulnerability is lower. Impacts are typically manageable through standard pavement design and drainage measures. Localized differential settlement may still occur where moisture conditions are inconsistent, such as near drainage features or utility trenches.

### Moderate LEP Areas (3-6%)

Areas with moderate LEP soils face a measurable vulnerability to expansive soil behavior. These soils can expand during wet conditions and contract during dry periods, contributing to pavement cracking and rutting, shoulder separation and edge drop-offs, distress in curb and gutter systems, and increased maintenance cycles. Infrastructure in these areas may require enhanced subgrade preparation, moisture conditioning, lime or cement stabilization, geotextile reinforcement, or underdrain systems to mitigate long-term performance issues.

### High LEP Areas (6-9%)

Areas containing high LEP soils are the most vulnerable to expansive soil impacts. These soils are highly sensitive to moisture variation and can undergo substantial volume changes. Potential impacts include significant pavement heaving or settlement, accelerated roadway deterioration and loss of ride quality, structural stress to bridges, culverts, and retaining walls, utility displacement or pipe joint separation, and increased lifecycle costs due to frequent repair or reconstruction. If not properly addressed during design and construction, expansive soils in high LEP areas can compromise

roadway service life, safety, and operational reliability. Climate variability, including more intense precipitation events followed by extended dry periods, can further exacerbate shrink-swell cycles.

## Erosion Hazard

In addition to landslides, natural erosion can be a problem. For example, slumping along the Heart River in Belfield has damaged properties. The city has established the Heart River Fund to mitigate further damage.

## Critical Facilities

Chapter 2 summarizes critical facilities in the study area. No buildings housing critical services are known to be at risk from landslides and critical facilities are located within the vicinity of abandoned mine lands. Landslides have impacted roads; the risk is greatest within the Badlands area. Impacts include the cost of reconstruction and economic impacts due to travel time delays, and potential disruption to freight or tourist activity. Additionally, landslides may damage pipelines, which can lead to hazardous materials release.

## Future Conditions

Chapter 2 describes regional growth trends. Most growth is anticipated in areas that are not susceptible to landslides. However, continued development is anticipated in Medora, which is located in the heart of the Badlands. Development that is located on or at the base of bluffs would be most susceptible to landslides. A future road is planned to provide secondary access to the Theodore Roosevelt Presidential Library and Medora Musical. Projects such as this require additional geotechnical work to ensure slope stability.

Through the end of this century in North Dakota, expect more frequent, larger, and more intense geologic hazards, such as landslides, riverbank collapse, and sinkholes. Both drought and heavy precipitation events are projected to occur more frequently, which is expected to contribute to an increased frequency of landslides where steep slopes are present, or to riverbank collapse where undercutting due to subsoil flow and/or antecedent flooding is possible. Both extremes also increase the potential for wind and water erosion. Increased development pressure and the impacts of future climate conditions may increase the risk to a variety of state infrastructure and assets if constructed or situated in areas prone to geologic hazards.

# SEVERE SUMMER WEATHER

## Overview

- **Overall Risk:** High
- **Probability:** Highly Likely
- **Primary Impacts:** Agricultural loss (crops/livestock); economic loss; increased stress on medical services; human loss and injuries; power loss; property damage; permanent loss of business; release of hazardous material
- **Related Hazards:** Flooding (flash floods)



Severe summer weather includes tornadoes, wind, hailstorms, heavy rains, lightning, and extreme heat. Severe summer storms occur frequently in the region and have the potential to cause widespread damage.

**Tornadoes** are violently rotating columns of air that extend from a storm cloud to the ground. A closely related event is a funnel cloud, which does not extend to the ground. Most tornadoes occur during the evening hours and travel from southwest to northeast, but they can move unpredictably in any direction. Tornado magnitude is measured by the Enhanced Fujita (EF) Scale, which replaced the Fujita Scale in 2007. Tornadoes can produce wind speeds ranging from 65 mph (EF0) to over 200 mph (EF5). Most tornadoes are EF0 or EF1; however, even an EF0 tornado has the potential to cause significant destruction, including widespread property damage, injuries, and fatalities. Most injuries are caused by flying debris.

**Straight-line winds** are a common element of severe summer storms. Strong winds often form on the leading edge of severe storms, and gusts of more than 100 miles per hour are possible. A **derecho** is a widespread, long-lived windstorm associated with a band of actively moving showers or thunderstorms. To be classified as a derecho, the wind damage swath of the storm must extend for more than 240 miles and the storm must include wind gusts of at least 58 miles per hour along most of its length. On June 19-22 of 2025, a significant tornado outbreak and associated derecho caused major damage across central and eastern North Dakota, northern Minnesota, and parts of southern Canada.

**Hailstorms** are a hazard to property, crops, livestock, and occasionally, human life. Hailstorms range in size from an of a few acres up to hundreds of square miles, although small events are most common. Hailstones can reach the surface at more than 100 miles per hour and may reach sizes of up to several inches in diameter; however, most hailstones do not exceed two inches in diameter.

**Lighting strikes** can electrocute humans and animals, vaporize materials, ignite fires, and cause electrical surges that can damage equipment. Lightning strikes are rarely fatal to humans, especially in North Dakota. Livestock deaths and property damage are more common threats.

**Extreme heat** is a prolonged period – at least two to three days – with temperatures exceeding 90 degrees Fahrenheit. The effect of high temperatures is exacerbated by humidity, which limits the human body’s ability to cool itself through sweat evaporation. Extreme summer heat poses risks to humans, pets, and livestock. Prolonged exposure to extreme heat can cause heat exhaustion or



heat stroke, a life-threatening condition. Children and the elderly are especially vulnerable.

## Location

Severe summer weather occurs at a regional level and is not a micro-climatic event. In general, a severe summer weather event occurs across the entire geographic area of a county. However, a severe summer weather event in one part of the study area may not impact the entire study area, because it is so large and there is significant variation in factors that influence the onset of severe weather. All parts of the four-county area are assumed to be at equal risk. Severe summer weather is dynamic; the formation and specific locations of high supercells, tornadoes, and related events can vary widely and are unpredictable as storms develop.

## Probability and Extent

Historical weather event data was collected from the National Climatic Center Storm Events Database. From 1996 through 2024, severe summer weather events were recorded during 631 days within the four-county area. **Table 31** provides data for several event types.

Based on this data, the annual probability of severe summer weather is very likely (100 percent) for all counties.

## Tornadoes

The annual probability of tornadoes is likely (30 percent). The National Climatic Data Center recorded 25 tornadoes from 1996 to 2024, including one EF-3 tornado that occurred near Dickinson in 2009, two EF-2 tornadoes, and five EF-1 tornadoes. **Figure 27** illustrates tornado paths for events that occurred from 1950 to 2023. Most tornadoes resulted in minimal damage.

### ENHANCED FUJITA SCALE

**EF0:** 65-85 MPH

**EF3:** 136-165 MPH

**EF1:** 86-110 MPH

**EF4:** 166-200 MPH

**EF1:** 111-135 MPH

**EF5:** Over 200 MPH

**Table 31. Severe Summer Weather Events (1996-2024)**

| Summer Weather Events by Sub-Type | County Event Days (Over 29-Year Period) |            |               |            | Discrete Event Days (Region) | Days per Year (Region)     | Annual Probabilities (Percent Years w/ an Occurrence) |               |               |               |               |
|-----------------------------------|---|------------|---------------|------------|------------------------------|----------------------------|---|---------------|---------------|---------------|---------------|
|                                   | Billings                                | Dunn       | Golden Valley | Stark      |                              |                            | Billings  | Dunn          | Golden Valley | Stark         | Across Region |
| Lightning*                        | 69                                      | 107        | 91            | 128        | (279)*                       | (9.21 days)                | 89.7%   | 96.6%         | 100.0%        | 100.0%        | 100.0%        |
| Large Hail**                      | 58                                      | 77         | 62            | 93         | 202                          | 6.97 days                  | 89.7%   | 96.6%         | 86.2%         | 96.6%         | 100.0%        |
| T-Storm Wind**                    | 21                                      | 54         | 46            | 63         | 134                          | 4.62 days                  | 41.4%   | 79.3%         | 75.9%         | 82.8%         | 100.0%        |
| Tornado                           | 2                                       | 9          | 6             | 12         | 25                           | 0.86 days                  | 6.9%  | 20.7%         | 20.7%         | 27.6%         | 48.3%         |
| Funnel Cloud                      | 2                                       | 7          | 6             | 7          | 21                           | 0.72 days                  | 6.9%  | 17.2%         | 13.8%         | 24.1%         | 34.5%         |
| High Wind (May-Sep)               | 17                                      | 13         | 16            | 23         | 25                           | 0.86 days                  | 34.5%   | 24.1%         | 31%           | 48.3%         | 51.7%         |
| Heavy Rain***                     | 8                                       | 13         | 4             | 9          | 21                           | 0.72 days                  | 20.7%   | 27.6%         | 17.2%         | 24.1%         | 44.8%         |
| Excessive Heat****                | 4                                       | 4          | 4             | 4          | 4                            | 0.14 days                  | 3.4%  | 3.5%          | 3.4%          | 3.4%          | 3.4%          |
| <b>Total</b>                      | <b>112</b>                              | <b>177</b> | <b>144</b>    | <b>211</b> | <b>432</b>                   | <b>10.93 days</b><br>***** | <b>100.0%</b>   | <b>100.0%</b> | <b>100.0%</b> | <b>100.0%</b> | <b>100.0%</b> |

\*Lightning days represent days with reported Large Hail or T-Storm Winds, as Lightning is present with all thunderstorms. Dangerous Cloud-to-Ground (CG) Lightning occurs with all thunderstorms and is the most prevalent summer hazard sub-type across ND. NCEI CG data, 1/1/1991 through 12/31/2022 (22 years), has annual average of 3.4 to 4.0 CG strikes per sq. mi. across the Region.

\*\*Large Hail and Damaging Thunderstorm Wind likely to occur from the same thunderstorm but are not always detected and/or reported concurrently. Regional T-storm Wind days represent those where large hail wasn't reported, while County days are all those reported. \*\*\*Heavy Rain days were composited from such reports within the Heavy Rain, Flash Flood, and Flood events in the NCEI Storm events Database (StormData). \*\*\*\*The Excessive Heat sub-type includes the equivalent Heat and Heat Index (Apparent Temp) categories as used in prior years. \*\*\*\*\*The average annual number of days with Severe Summer Weather reflects those days with one or more of the above sub-types.

Source: National Climatic Data Center Storm Events Database



## High Wind (Summer)

High wind can occur separately from the presence of tornados or thunderstorms (although they most often occur concurrently with these weather events). These are non-convective winds which are estimated using the Beaufort Wind Scale (**Table 32**). **Sustained Winds** are those that are Greater-Than-or-Equal-to (GTE) 40 mph, while **Wind Gusts** are GTE 58 mph. The NWS issues a High Wind Warning when sustained winds of 40 mph or greater are occurring or are expected in the next 12-24 hours. The NWS procures a seven-day Graphical Hazardous Weather Outlook (GHWO) for High Winds across North Dakota, with a national outlook out to three days (WSSI). According to the NDCC’s Storm Events Database, there were 84 days with high wind events in the region from 1996 to 2024. In addition, there were 134 days with thunderstorm winds. The highest measured gust was 89 miles per hour (77 knots), as recorded near Dickinson on June 6, 2013. An estimated gust of 104 knots (120 mph) was recorded near Fairfield in Billings County on July 10, 2022.

**Table 32. Beaufort Wind Chart**

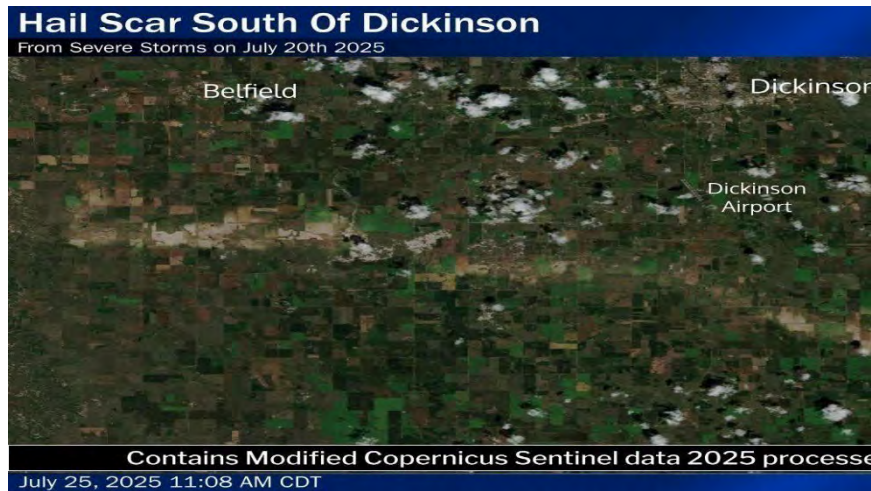
| Beaufort Number | Range (MPH) | Average (MPH) | Terminology   | Description                                  |
|-----------------|-------------|---------------|---------------|--|
| 0               | 0           | 0             | Calm          | Calm. Smoke rises vertically.                |
| 1               | 1-3         | 2             | Light air     | Wind motion visible in smoke.                |
| 2               | 4-7         | 6             | Light breeze  | Wind felt on exposed skin. Leaves rustle.    |
| 3               | 8-12        | 11            | Gentle breeze | Leaves and smaller twigs in constant motion. |

| Beaufort Number | Range (MPH) | Average (MPH) | Terminology     | Description   |
|-----------------|-------------|---------------|-----------------|---|
| 4               | 13-18       | 15            | Moderate breeze | Small branches begin to move.                                 |
| 5               | 19-24       | 22            | Fresh breeze    | Smaller trees sway.   |
| 6               | 25-31       | 27            | Strong breeze   | Large branches in motion. Whistling heard.                    |
| 7               | 32-38       | 35            | Near gale       | Whole trees in motion. Some difficulty walking into the wind. |
| 8               | 39-46       | 42            | Gale            | Twigs broken from trees. Cars veer on road.                   |
| 9               | 47-54       | 50            | Severe gale     | Light structure damage.                                       |
| 10              | 55-63       | 60            | Storm           | Trees uprooted. Considerable structure damage.                |
| 11              | 64-73       | 70            | Violent storm   | Widespread structural damage.                                 |
| 12              | 74-95       | 90            | Hurricane       | Considerable/widespread damage to structures.                 |

Source: NWS Northern Indiana. Beaufort scale measures sustained winds (2-minute average).

## Hail

The annual probability of hailstorms is very likely (100 percent) due to the number of severe summer weather events that take place in the state. A severe hail event is defined as a storm producing hailstones larger than 0.75 inches in diameter. All events recorded by the National Climatic Data Center are severe hail events. According to NDCC's Storm Events Database, **the largest hailstone recorded in the four-county area from 1996 to 2024 was 4.5 inches in diameter.** This hailstorm occurred on June 8, 2002, near Sentinel Butte. Hail size can be measured in both inches and millimeters but is commonly described using comparisons to other well-known items (Table 33).



A hail scar is visible south of Belfield and Dickinson in Stark County from the severe storms of July 20, 2025. (Source: National Weather Service)

**Table 33. NWS Hail Size References**

| Diameter (Inches) | Diameter* (mm) | Description            |
|-------------------|----------------|------------------------|
| 1/4               | 6.4            | Pea                    |
| 1/2               | 12.8           | Small marble, Mothball |
| 3/4               | 19.1           | Penny                  |
| 7/8               | 22.4           | Nickel                 |
| 1                 | 25.4           | Quarter                |
| 1 1/4             | 31.8           | Half Dollar            |
| 1 1/2             | 38.1           | Walnut, Ping Pong Ball |
| 1 3/4             | 44.5           | Golf Ball              |
| 2                 | 50.8           | Lime, Hen Egg          |
| 2 1/2             | 63.5           | Tennis Ball            |
| 2 3/4             | 69.9           | Baseball               |
| 3                 | 76.2           | Large Apple, Teacup    |
| 4                 | 101.6          | Softball               |
| 4 1/2             | 114.3          | Grapefruit             |
| > 4 1/2           | > 114.3        | CD / DVD Discs         |

Source: NWS, 2021a. \*metric conversion of table added.

## Lightning

According to the NDCC’s Storm Events Database, there were 13 event days lightning events in the region from 1996 to 2024. Lightning-strike fatalities are rare. According to the National Weather Service and the National Lightning Safety Council, 13 fatalities occurred in North Dakota from 1959 to 2019, including one in the study area. **On August 4, 2019, a lightning strike killed a trail worker near Richardton in Stark County.** Lightning has also been documented as a cause of wildfires and property damage in rural areas.

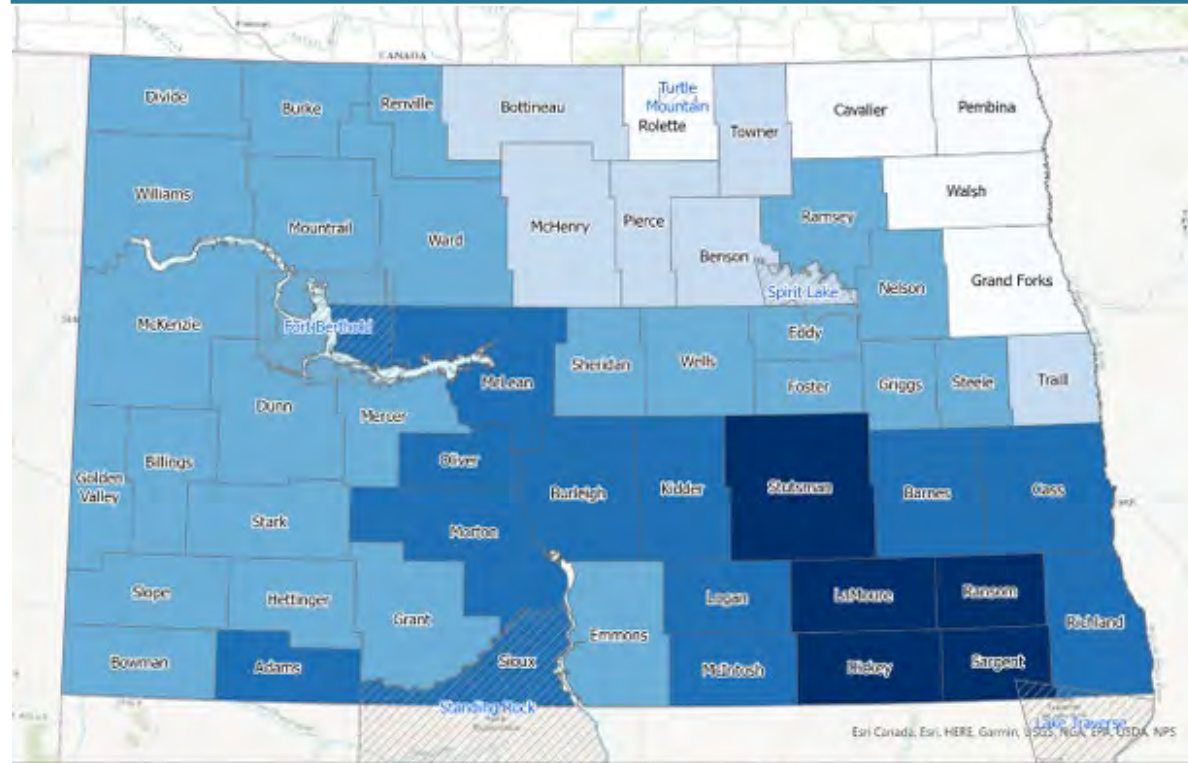
The extent and probability of lightning is based on Cloud-to-Ground Lightning forecast (potential LAL): Lightning Activity Level (**Table 34**). Annual Cloud-to-Ground Lightning Events in North Dakota are shown in **Figure 28**. For the four-county study area, there are on average 21 to 25 cloud-to-ground lightning strikes per 4x4 square km (about 3.4-4 strikes per square mile, per year).

**Table 34. Thunderstorm Probability and Related Lightning Activity Level (LAL)**

| Thunderstorm Probability | Thunderstorm Category | Rain Intensity                              | LAL | Lightning Characteristics                                |
|--------------------------|-----------------------|---|-----|--|
| None                     | None                  | Variable                                    | 1   | None   |
| 10%                      | Isolated              | Light rain occasionally reaching the ground | 2   | 1 to 5 GC lightning strikes in 5-minute period.          |
| 20%                      | Widely Scattered      | Light to moderate rain reaching ground      | 3   | 6 to 10 GC lightning strikes in a 5-minute period.       |
| 30-50%                   | Scattered             | Moderate rain is common.                    | 4   | Frequent, 11 to 15 CG strikes in 5-minute period.        |
| 60-70%                   | Numerous              | Moderate to heavy rainfall.                 | 5   | Frequent and intense, 15+ CG strikes in 5-minute period. |
| 20% (Dry)                | Dry Lightning         | Little to no rain.                          | 6   | Like LAL 3 but w/o rain, w/higher wildland fire threat.  |

Source: FEMA NR/NOAA-NCEI Lightning Database, 2023

**Figure 28. Annual Cloud-to-Ground Lightning Events in ND, 1991-2012**



| 4x4 sq km | 1 sq mi   |
|-----------|-----------|
| 12-18     | 2.5 - 3.0 |
| 19-20     | 3.1 - 3.3 |
| 21-25     | 3.4 - 4.0 |
| 26-30     | 4.1 - 4.9 |
| 31-35     | 5.0 - 5.7 |

**LIGHTNING ANNUAL EVENTS**

|         |         |         |
|---------|---------|---------|
| 15 - 18 | 21 - 25 | 31 - 35 |
| 19 - 20 | 26 - 30 |         |

Map Date: 11/12/2023  
 Data Source: National Risk Index/  
 Department of Homeland Security  
 Data date: 2023  
 \*Intended for Planning Purposes Only\*



Source: FEMA NRI/NOAA-NECI Lightning Database, 2023

## Excessive Heat

The extent of excessive heat is based on a temperature and humidity heat index which is maintained by the National Weather Service (Table 35). For the study area, the heat index scale for extreme heat ranges from a minimum of GTE 75 degrees to GTE 105 degrees.

**Table 35. NWS Heat Index**

|                   |     | Temperature (°F) |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|-------------------|-----|------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|                   |     | 80               | 82 | 84  | 86  | 88  | 90  | 92  | 94  | 96  | 98  | 100 | 102 | 104 | 106 | 108 | 110 |
| Relative Humidity | 40  | 80               | 81 | 83  | 85  | 88  | 91  | 94  | 97  | 101 | 105 | 109 | 114 | 119 | 124 | 130 | 136 |
|                   | 45  | 80               | 82 | 84  | 87  | 89  | 93  | 96  | 100 | 104 | 109 | 114 | 119 | 124 | 130 | 137 |     |
|                   | 50  | 81               | 83 | 85  | 88  | 91  | 95  | 99  | 103 | 108 | 113 | 118 | 124 | 131 | 137 |     |     |
|                   | 55  | 81               | 84 | 86  | 89  | 93  | 97  | 101 | 106 | 112 | 117 | 124 | 130 | 137 |     |     |     |
|                   | 60  | 82               | 84 | 88  | 91  | 95  | 100 | 105 | 110 | 116 | 123 | 129 | 137 |     |     |     |     |
|                   | 65  | 82               | 85 | 89  | 93  | 98  | 103 | 108 | 114 | 121 | 128 | 136 |     |     |     |     |     |
|                   | 70  | 83               | 86 | 90  | 95  | 100 | 105 | 112 | 119 | 126 | 134 |     |     |     |     |     |     |
|                   | 75  | 84               | 88 | 92  | 97  | 103 | 109 | 116 | 124 | 132 |     |     |     |     |     |     |     |
|                   | 80  | 84               | 89 | 94  | 100 | 106 | 113 | 121 | 129 |     |     |     |     |     |     |     |     |
|                   | 85  | 85               | 90 | 96  | 102 | 110 | 117 | 126 | 135 |     |     |     |     |     |     |     |     |
|                   | 90  | 86               | 91 | 98  | 105 | 113 | 122 | 131 |     |     |     |     |     |     |     |     |     |
|                   | 95  | 86               | 93 | 100 | 108 | 117 | 127 |     |     |     |     |     |     |     |     |     |     |
|                   | 100 | 87               | 95 | 103 | 112 | 121 | 132 |     |     |     |     |     |     |     |     |     |     |

**Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity:** Light Yellow – Caution; Light Orange – Extreme Caution; Dark Orange – Danger; Red – Extreme Danger.

Source: <https://www.weather.gov/safety/heat-tools>

## Vulnerabilities and Impacts

### Historical Event Summary

The National Climatic Data Center's Storm Events Database includes brief summaries of significant storm events. A selection of recent summer storm events within the four-county area is summarized below.

- **August 15, 1999.** Thunderstorm winds damaged a water tank at a cost of \$80,000 in Dunn County.
- **August 15, 1999.** Hail with a diameter of 3 inches fell in and near Dickinson, causing \$2 million in damages.
- **February 13, 2011.** High winds blew over a semi-trailer in Billings County and caused \$20,000 in damages.
- **June 19, 2005.** A large thunderstorm accompanied by hail caused \$3 million in damages in Stark County.
- **June 24, 2009.** An EF-1 tornado touched down near Belfield and caused \$700,000 in damages.
- **July 8, 2009.** An EF-3 tornado passed through the south side of Dickinson, causing \$20 million in property damages.
- **July 10, 2016.** 1.75-inch diameter hail fell in Billings County and caused \$350,000 in damages.
- **July 10, 2016.** 3.25-inch diameter hail fell in Dunn County and caused \$21 million in damages.
- **July 10, 2022.** Thunderstorms with high winds caused \$3 million in damages in Fairfield in Billings County.
- **August 8, 2019.** A man died when he was struck by lightning while working on a trail at the Schnell Recreation Area in Stark County.

### Population

The entire population of the four-county region is vulnerable to a severe summer storm event. Residents living in homes without a basement or permanent foundations are particularly vulnerable to tornado and wind events. There are approximately 1,847 mobile homes in the region according to the American Community Survey Estimates for 2023. Applying the county's average household size of 2.45 persons, **there are approximately 4,525 persons in the region with an enhanced vulnerability to severe summer weather.** See Table 22 in the Geologic Hazards section for a county breakdown.

### Property

**Table 36** on the following page summarizes the property damage impacts of severe summer weather from 1996 to 2024, as well as human costs. The majority of property damages were sustained during two events – the 2009 tornado that caused an estimated \$20 million in damages in Dickinson and the 2016 hailstorm that caused an estimated \$21 million in damages in Killdeer.

**Table 36. Impacts of Severe Summer Weather (1996-2024)**

| Event Type         | Damages             | Fatalities | Injuries  |
|--------------------|---------------------|------------|-----------|
| Hail               | \$29,678,000        | 0          | 5         |
| Tornadoes          | \$21,030,000        | 0          | 2         |
| Thunderstorm Winds | \$923,500           | 0          | 4         |
| High Winds         | \$205,000           | 0          | 1         |
| Lightning          | 403,500             | 1          | 0         |
| <b>Total</b>       | <b>\$52,240,000</b> | <b>1</b>   | <b>11</b> |

Source: National Climatic Data Center Storm Events Database

### Critical Facilities

Chapter 2 describes critical facilities in the study area. All critical buildings and structures are vulnerable to a severe summer storm event. Electrical facilities and communication systems are particularly vulnerable to severe summer weather. Damage can cause power outages or disrupt communication, which may hinder emergency response and essential services. Downed power lines, trees, or other debris could impede roadway travel and present safety concerns. Critical buildings such as hospitals and fire stations should have a backup power source in case of emergency.

### Future Conditions

Chapter 2 describes regional growth trends. Given the unpredictable nature of severe summer storms, all future development is assumed to be at equal risk.

Through the end of this century in North Dakota, expect more frequent, larger, and longer duration storms with an increase in intense rain and flooding, and an increase in large hail. Potential

Impacts include an expected increase (high confidence) in heavy precipitation events overall, higher in north-central and northeast North Dakota, and somewhat lesser in lesser in southwest North Dakota, with a likely increase in areal and/or flash flooding but less certain impacts on summertime riverine flooding. Hail size, frequency of large hail, and length of the hail season should increase (medium confidence) with a commensurate increase in the frequency and intensity of lightning and damaging downburst winds which are tied to hail production. Expected increases in temperature are likely to lead to an increase in days with a high Heat Index and the potential for lost workhours during such periods.



### Risk Perception

Workshop participants perceived that future severe summer weather is **likely (4.25)** and that future impacts would be **moderate to significant (3.64)**.

# SEVERE WINTER WEATHER

## Overview

Severe winter weather includes blizzards, heavy snow, ice storms, and extreme cold/wind chills. These hazards can produce life-threatening conditions and are a threat to property. Winter storms also disrupt economic activity. All areas of the region are at equal risk.

- **Overall Risk:** High
- **Probability:** Very Likely
- **Primary Impacts:** Road closures, agricultural loss (crops/livestock), economic loss, exposure risk (people, pets, and livestock), freezing pipes, power loss, property damage, school closure, vehicle crashes
- **Related Hazards:** Flooding, Transportation Incidents

**Blizzards** are defined by the National Weather Service as storms producing winds of 35 miles per hour or more, with snow or blowing snow reducing visibility to less than 0.25 miles for at least three hours. A surface blizzard is a related event that produces similar conditions when heavy winds blow snow that has already accumulated.



Blizzards disrupt transportation and communication systems, can produce life-threatening conditions, and are common in all four counties.

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

**Extreme cold** is defined as “temperatures well below zero.” Heavy winds amplify hazards by creating dangerous wind chills. Exposure to

extreme cold/wind chills can induce frostbite or hypothermia for humans and livestock.

## COLD SNAP

A polar vortex event occurs when the polar vortex, a large mass of cold air circling the Arctic, weakens and allows frigid air to plunge southward. A cold snap in late January and February 2025 brought record-breaking temperatures to North Dakota, with wind chills ranging from -30°F to -60 °F across the state.

**Ice storms** result from the combination of rain and below-freezing surface temperatures, which causes ice to accumulate on the ground. Ice storms create hazardous conditions for motorists, pedestrians, and livestock, and can bring down trees and power lines.

## Location

Severe winter weather occurs at a regional level and is not a micro-climatic event. In general, a severe winter weather event occurs across the entire geographic area of a county. However, a severe winter weather event in one part of the study area may not impact the entire study area, because it is so large and there is significant variation in factors that influence the onset of severe weather. All parts of the four-county area are assumed to be at equal risk.

## Probability and Extent

**Table 37** identifies severe winter weather events that occurred from 1996 through 2024, per the National Climatic Data Center Storm Events Database. On average, a severe winter weather event occurs roughly five days per year. Blizzards occur with the greatest frequency, followed by heavy snow and winter storm events. **The annual probability of any single severe winter weather event is 100 percent.** Nine presidential disaster declarations were issued for severe winter weather between 1966 and 2023. Extent of extreme cold is based on a cooling rate table (**Table 38**) for people exposed to cold which is maintained by the National Weather Service. Extreme cold is common across North Dakota during the winter months. In North Dakota, -40 degrees is the trigger point for a wind chill warning while -23 or -30 degrees is the trigger point for a wind chill advisory for multiple counties for multiple hours in length.

**Table 37. Severe Winter Weather Events (1996-2024)**

| Winter Weather Events by Sub-Type | County Event Days (Over 29-Year Period) |            |               |            | Discrete Event Days (Region) | Days per Year (Region)    | Annual Probabilities (Percent Years w/ an Occurrence) |               |               |               |               |
|-----------------------------------|---|------------|---------------|------------|------------------------------|---------------------------|---|---------------|---------------|---------------|---------------|
|                                   | Billings                                | Dunn       | Golden Valley | Stark      |                              |                           | Billings  | Dunn          | Golden Valley | Stark         | Across Region |
| Blizzard                          | 60                                      | 55         | 60            | 58         | 63                           | 2.17 days                 | 62.1%   | 55.2%         | 58.6%         | 58.6%         | 62.1%         |
| Heavy Snow                        | 28                                      | 38         | 25            | 34         | 51                           | 1.76 days                 | 48.3%   | 48.3%         | 44.8%         | 44.8%         | 58.6%         |
| Winter Storm*                     | 30                                      | 34         | 27            | 26         | 41                           | 2.28 days                 | 66.7%   | 83.3%         | 61.1%         | 61.1%         | 83.3%         |
| Ice Storm**                       | 0                                       | 0          | 0             | 0          | 0                            | 0                         | 0.0%  | 0.0%          | 0.0%          | 0.0%          | 0.0%          |
| Extreme Cold***                   | 41                                      | 50         | 40            | 44         | 50                           | 1.72 days                 | 41.4%   | 44.8%         | 41.8%         | 44.8%         | 44.8%         |
| High Wind (Oct-Apr)               | 57                                      | 49         | 54            | 61         | 65                           | 2.24 days                 | 75.9%   | 72.4%         | 72.4%         | 75.9%         | 75.9%         |
| Snow Squall ****                  | 0                                       | 0          | 0             | 0          | 0                            | 0                         | 0.0%  | 0.0%          | 0.0%          | 0.0%          | 0.0%          |
| <b>Total</b>                      | <b>216</b>                              | <b>226</b> | <b>206</b>    | <b>223</b> | <b>270</b>                   | <b>9.21 days</b><br>***** | <b>100.0%</b>   | <b>100.0%</b> | <b>96.7%</b>  | <b>100.0%</b> | <b>100.0%</b> |

\*In this Region, Winter Storms were listed primarily from 1996-2013 (18 years), but decreased as the use of other, more specific sub-types increased.

\*\*In ND, if/when Ice Storms occur they often transition into other winter weather sub-types, such as Winter Storm or Blizzard, unless they stay primarily ice.

\*\*\*The Extreme Cold sub-type includes the equivalent Cold and Wind Chill (Apparent Temp) categories as used in prior years.

\*\*\*\*Snow Squalls were a new category introduced in the 2020-2021 season for brief, small, convective-scale snowfall, blizzard-like conditions.

\*\*\*\*\*The average annual number of days with Severe Winter Weather reflects those days with one or more of the above sub-types.

**Source: National Climatic Data Center Storm Events Database**

**Table 38. Wind Chill Chart**

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

**Frostbite Times:** Medium Blue – 30 minutes; Dark Blue – 10 minutes; Purple – 5 minutes

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

Where, T=Air Temperature (°F) V=Wind Speed (mph)

**Source:** <https://www.weather.gov/safety/cold-wind-chill-chart>

## Vulnerabilities and Impacts

Severe winter weather can cause property damage, road closures, vehicle crashes, economic loss, power loss, and other impacts. Blizzard events from 1996 to 2024 caused an estimated \$17.6 million in property damages, according to the National Climatic Data Center's Storm Events Database. Additional financial impacts accrue due to lost business and work hours.

### Population

Vulnerable populations include the homeless and residents living in mobile homes, recreational vehicles, or poorly insulated homes. Such persons may find it difficult to find shelter or adequately heat their homes during period of extreme cold. There are approximately 1,850 mobile homes in the region with an estimated 4,525 residents. (See **Table 30** for a county breakdown.)

### 1997 BLIZZARDS

The most significant blizzards occurred in January and April of 1997. These events caused an estimated \$14 million in damages. Statewide, the blizzards of 1997 resulted in the deaths of over 100,000 cattle.

Blizzards, heavy snows, and extreme cold create hazardous conditions that can "trap" residents in their homes, potentially without power or heat. Elderly residents are particularly vulnerable to severe winter weather, as they are the most likely to have limited mobility, especially in the event of hazardous road/sidewalk conditions. Approximately 5,700 residents in the study area are age 65 or older. (See **Table 5** for a county breakdown.)

## Property

It is difficult to estimate the impact of winter storms on property in the four-county area. **The most likely damages involve roof collapse due to heavy snow loads, and vehicle accidents.** Generally, metal roofing systems, steel decks, and boards on joists are most susceptible to collapse from snow or rain loads. Roof collapse is most likely for older structures that may not have been constructed to modern snow and wind load design codes. According to the 2000 Decennial Census estimates, there are approximately 5,703 housing units in the region that were built before 1940. A winter storm can also result in an increased risk of structure fire due to use of portable heaters and fireplaces during events that involve extremely cold temperatures.

### Critical Facilities

Power outages can reduce or eliminate the functionality of critical facilities, unless they have an independent backup power supply. Winter storm events may limit the ability of fire and ambulance responders to respond to those needing service. Severe winter storm events often force school closures. In rural areas, students often travel long distances to schools, increasing the likelihood of lost time in the classroom and the risk of traffic accidents. Residents who require assistance for daily living, including those in special care facilities, are vulnerable during periods of power failure.

Severe winter weather impedes transportation systems, making travel difficult and potentially dangerous. Road or bridge closures disrupt freight shipments, causing supply chain issues. Communities with limited highway access, such as South Heart and Medora, could be especially vulnerable to highway closure. Dangerous travel conditions also impede emergency response.

## Future Conditions

Chapter 2 describes regional development trends. Given the regional nature of severe winter weather, all future development is assumed to be at equal risk.

Through the end of this century in North Dakota, expect larger, more frequent, and more intense periods of heavy wet snow, mixed precipitation or ice storms, and freezing drizzle or mist, with somewhat warmer temperatures. Potential Impacts include a likely increase in winter season precipitation, overall, along with more periods of heavy snowfall and/or freezing rain/ice events. Warmer winter season temperatures will support a higher incidence of mixed precipitation (sleet), freezing rain, or ice storms, which will likely impact transportation, power transmission, roof loading, critical facilities, and infrastructure, along with general health and safety. Human health impacts include an increased incidence of heart, back, and/or muscle related injuries from shoveling snow or falling on ice.



### Risk Perception

Workshop participants perceived that the future severe winter weather is **very likely (4.63)** and that future impacts would be **significant (3.92)**.

# SPACE WEATHER

## Overview

- **Overall Risk:** Low
- **Probability:** Unlikely
- **Primary Impacts:** Power outages, economic loss, property damage, pipeline damage, human costs.
- **Related Hazards:** Hazardous Materials Release



NASA describes space weather as any and all conditions and events on the sun, in the solar wind, in near-Earth space, and in Earth's upper atmosphere that can affect space-borne and ground-based technological systems. Generally, it takes the form of particles, electromagnetic energy, and magnetic fields. Space weather events include but are not limited to:

- **Geomagnetic storms**, which are major disturbances of Earth's magnetosphere caused by solar winds. Geomagnetic storms can disrupt satellites, radio communication, and GPS navigation systems. They can also damage the power grid and pipelines.
- **Solar radiation storms**, which are episodic and large-scale magnetic eruptions on the sun's surface that typically result in a coronal mass ejection (CME) or solar flares. These events can send massive amounts of charged particles toward the Earth's magnetosphere and may last for minutes or hours. Solar radiation storms can expose impact high-frequency (HF) radio communications. The Solar Radiation Storm Scale (S-Scale) categorizes solar energetic particle (SEP) events from S1 (minor) to S5 (extreme) based on proton flux levels, with

increasing risks to astronauts, aircraft, satellites, and HF radio communications at higher levels.

- **Radio blackouts**, which are solar-flare-induced high-frequency radio communication disruptions, are caused by X-ray bursts from solar flare ionizing the ionosphere, absorbing radio waves. The NOAA Radio Blackout (R-Scale) is a five-level (R1-R5) system which categorizes the phenomenon.

Geomagnetic storms, solar radiation storms, and radio blackouts pose a threat to communities because of the widespread reliance on technological systems.

## Location

Space weather events from the sun or asteroids can impact any place on earth. A significant space weather event would be expected to impact the entire four-county region.



Image Credit: North Dakota Office of Tourism

## Probability and Extent

While the probability of a space weather event disrupting the four-county region is low, a large-scale event would potentially create catastrophic impacts. The magnitude of space weather events are categorized as follows:

- **Solar Radiation Storms.** NOAA tracks solar radiation storms on the S-Scale. Warnings are issued for all storms that are S1 through S5. New alerts are issued as the level increases.
- **Geomagnetic Storms.** Geomagnetic storms are tracked on the G-Scale and the planetary K-index (Kp scale) (Table 39). This measures the intensity of geomagnetic activity on a scale of 0 to 9. Alerts are issued at all Kp levels. Warnings are issued for all geomagnetic storms with a Kp level of 4 or higher. There are no recorded catastrophic space weather effects in North Dakota.

Notable historical events from around the world include:

- **1859 Carrington Event.** This event disrupted global communications and ignited fires in telegraph offices in a largely pre-electric world. Vivid auroras were seen around the globe in both Hemispheres. If a Carrington-level event occurred today, it could produce more \$2.6 trillion in damages in the U.S. alone, as noted in the State of North Dakota 2024-2029 Enhanced Mitigation Mission Area Operations Plan.
- **1921 New York Railroad Storm.** This space weather event is considered to be the largest of the 20<sup>th</sup> Century. This

geomagnetic storm sparked fires at a railroad control tower, disrupting trains and telegraph services. Telegraph service across the U.S., including in North Dakota, were delayed due to blown fuses and damaged equipment.

- **1989 Great Quebec Blackout.** The Great Quebec Blackout caused significant power fluctuations and outages in North America and Northern Europe. Damages were most extreme in Quebec and New England, where outages lasting nine hours or more impacted an estimated six million people. Cascading impacts rippled throughout North America, including North Dakota.

## NEAR MISS

On July 23, 2012, a potential Carrington-scale event missed Earth on its orbital path by one week.

## Statewide Interoperable Radio Network

North Dakota has been expanding its Statewide Interoperable Radio Network (SIRN) to reduce interference and improve capacity. Improvements will replace tower-to-tower communications with trunk lines, which will mitigate interruptions to radio communications in the study area.

**Table 39. Geomagnetic Storms Scale**

| G Scale   | Description     | Kp Measure | Impacts   | Average Frequency*                         |
|-----------|-----------------|------------|---|--|
| <b>G1</b> | <b>Minor</b>    | 5          | <b>Power systems:</b> Weak power fluctuations may occur.  | 1,700 per solar cycle (900 days per cycle) |
| <b>G2</b> | <b>Moderate</b> | 6          | <b>Power systems:</b> High-latitude power systems may experience voltage alarms. Long-duration storms may cause transformer damage.<br><b>Other impacts:</b> HF radio propagation may fade at high latitudes.   | 600 per solar cycle (360 days per cycle)   |
| <b>G3</b> | <b>Strong</b>   | 7          | <b>Power systems:</b> Voltage corrections may be required. False alarms may be triggered on some protection devices.<br><b>Other impacts:</b> Intermittent satellite navigation and LF radio navigation problems may occur, HF radio may be intermittent.   | 200 per solar cycle (130 days per cycle)   |
| <b>G4</b> | <b>Severe</b>   | 8          | <b>Power systems:</b> Possible widespread voltage control problems. Some protective systems will mistakenly trip out key assets from the grid.<br><b>Other impacts:</b> Induced pipeline currents affect preventative measures, HF radio propagation sporadic, satellite navigation degraded for hours, LF radio navigation disrupted.  | 100 per solar cycle (60 days per cycle)    |
| <b>G5</b> | <b>Extreme</b>  | 9          | <b>Power systems:</b> Widespread voltage control problems and protective system problems can occur. Some grid systems may experience complete collapse or blackouts. Transformers may experience damage.<br><b>Other impacts:</b> Pipeline currents can reach hundreds of amps, HF radio propagation may be impossible in many areas for 1-2 days, satellite navigation may be degraded for days, and LF radio navigation may be out for hours. | 4 per solar cycle (4 days per cycle)       |

Source: NOAA Space Weather Prediction Center (2023). \*One solar cycle equals 11 years.

## Vulnerabilities and Impacts

### Population

Except in the case of a high intensity solar radiation storm, the direct impacts of a space weather event on people is limited. However, nearly all of the region's population relies directly or indirectly on electricity for normal, essential functions such as heating and cooling, obtaining water, waste disposal, food refrigeration, communications, and transportation. If a space weather event caused the loss of power, the impact for a short time would be an inconvenience for most, but critical for a few. Loss of power for an extended period of time could result in significant challenges to sustain life in the region as we know it.

### Property

The most likely space weather phenomena to impact the study area are geomagnetic storms and solar flares. While these events primarily impact communication, physical damage to property is possible. During a geomagnetic storm, the Earth's magnetic field fluctuates, which can induce a direct current (DC) in electrical transmission lines. This can cause permanent damage to transformers. Similarly, geomagnetic storms can accelerate corrosion of oil and gas pipelines, reducing their lifespan and potentially leading to leaks.

### Critical Facilities

Chapter 2 describes critical facilities. All critical facilities in the region rely on electrical power to function properly. Most of these critical facilities do not have a backup power source. Therefore, short-term and long-term functionality of most critical facilities in the region could be reduced or destroyed. Electrical power to the four-county area is sourced from the Upper Missouri Power Cooperative and MDU, and distributed by McKenzie Electric Coop, Roughrider Electric

Coop, and Goldenwest Electric Coop. Although local power cooperatives have plans to get local power infrastructure up and running after such disasters, the minimum timeframe to do so is a matter of weeks or months. A major space weather event could make fixing damaged substations moot in view of other electrical grid damage and system failure. Therefore, the time to get power back online could be much longer.

One of the most significant and immediate potential impacts of a space weather event would be disruption or destruction of electronic systems used for healthcare in the region. Mitigation measures to protect or replace these electronic systems are not in place. The electronic systems of the CHI St. Alexius Health in Dickinson, CHI St. Alexius Health clinic in Beach, Coal Country Community Health Center, Sanford Health Clinics, Richardton Health Center and Clinic, Evergreen, Dickinson Country House, Hilltop Home, Able Inc, St. Benedicts Health Center, St Luke's Home, and Golden Valley Manor are not hardened to withstand such an event.

Emergency communications systems and all other communications systems are critical to emergency notification and response functions in the region, and could be disrupted or destroyed by a major space weather event. Even minor geomagnetic storms can disrupt radio communications, as noted by the Golden Valley County Sheriff's Office.

### Future Conditions

Chapter 2 describes regional growth trends. All future growth areas will be similarly exposed to space weather risks. Exposure can be reduced by hardening electrical systems and utilities.

Through the end of this century in North Dakota, future climate conditions are not expected to directly impact the occurrence of space weather events, though indirectly the extent, intensity, and

frequency of hazard-related impacts could potentially be increased. Indirectly, if extreme climate variability begins to stress area power grids, satellite and terrestrial communications infrastructure, and other critical facilities, then there is a potential for increased (compounding) impacts from any concurrent space weather hazard phenomena in these and related areas.



## Risk Perception

Workshop participants perceived that the future space weather is **unlikely (2.40)** and that future impacts would be **minor to moderate (2.68)**.

# URBAN FIRE

## Overview

**Overall Risk:** Moderate

- **Probability:** Very Likely
- **Primary Impacts:** Human loss and injuries, localized evacuation, property damage
- **Related Hazards:** Flooding, Geological Hazards (landslides)

In contrast to wildland fires, urban fires are unplanned fires that occur in developed areas. These are the fires that local fire departments respond to.

## Location

Urban fires can occur anywhere in the built environment, including residential buildings, commercial businesses, industrial centers, recreational venues, and institutional buildings. Certain industrial land uses may have larger risks of fires – for example, battery energy storage systems (BESS), an emerging use in North Dakota, are a known fire hazard. Under the International Building Code (IBC), sprinkler systems are required for most commercial buildings and all Group R buildings, including hotels, apartments, condominiums, dormitories, and certain care facilities. With built-in fire suppression systems, these buildings have a reduced risk of fire outbreak. While urban fires occur frequently, the extent remains localized.



## Probability and Extent

Structure fires will occur each year with high certainty. The risk increases with population. Stark County is the most urbanized county

in the study area, with 83 percent of the total population. According to FEMA’s National Fire Incident Reporting System (NFIRS), Stark County reported the sixth-highest number of structure fires from 2017-2021 with 244, or an average of nearly 50 per year. The probability and risk of urban/structure fires is lower in the other counties, simply because there are fewer structures.

The extent of structure fires can be limited by adopting a fire safety mindset and preparedness measures. Smoke detectors are the most effective tool to increase warning time, save lives, and enable efficient response. According to the NFIRS, in over 80 percent of the fires in which a detector is used, the occupant was alerted to the fire by the detector.

## Vulnerabilities and Impacts

### Population

According to the U.S. Fire Administration (USFA), residential structure fires in North Dakota cause 1.5 deaths and 21.4 injuries per 1,000 fires. Therefore, some fire-related injuries could be expected on an annual basis, but death would be a rarity.

### Property

Vulnerability to structure fire is directly related to property condition. As fire codes, material quality, and technology have improved over the years, older buildings can be considered more vulnerable to structure fires, especially if they have not been brought up to the latest building/electrical codes.

In addition, mobile homes and manufactured homes have increased vulnerability to structure fires. Construction standards for mobile homes and manufactured homes progressed after 1974 with passage of the National Manufactured Housing Construction and Safety

Standards and again in 2000 with the Manufactured Housing Improvement Act. Mobile homes and manufactured homes that were produced prior to 2000, and especially prior to 1974, can be considered more vulnerable to structure fires.



*In February 2024, a fire damaged a mobile home in Dickinson, resulting in the death of a family pet. (Image Credit: The Dickinson Press)*

## Critical Facilities

Chapter 2 describes critical facilities in the study area. Urban fires can directly damage schools, government facilities, and medical facilities. Fire damage to power lines, transmission towers, or substations could lead to power outages and disrupt essential services. A major fire could strain the capacity of firefighters/emergency responders. Certain industrial activities increase fire risk – for example, bulk fuel storage. In addition, a fire could result in the release of hazardous materials, which could create additional health and environmental concerns for the impact area.

## Future Conditions

Chapter 2 describes regional growth trends. In general, modern building codes and zoning codes protect new development from fire risks by requiring sprinkler systems, fire-resistant walls, building setbacks, and other standards. Likewise, modern manufactured homes are less susceptible to fire than older mobile homes. That said, as growth occurs, cities and counties need to ensure adequate response times and water supply to new and existing neighborhoods. Dickinson is by far the largest city in the study area and is expected to experience the most growth in the future. Most future development is planned for its western growth area. A new fire station is planned for the west side of town, which will improve the city's overall fire coverage. GIS can be used to aid site selection by modeling response times and overall coverage from various locations.

# WILDLAND FIRE

## Overview

**Overall Risk:** High

- **Probability:** Very Likely
- **Primary Impacts:** Agricultural loss (crops/livestock), economic loss, human loss and injuries, localized evacuation, property damage or loss road closures
- **Related Hazards:** Flooding, Geological Hazards (landslides)

A wildland fire is an unplanned fire, a term which includes grass fires, forest fires and scrub fires either human-caused or natural in origin.



Many of the fires occur in or near urban/suburban areas. Wildland fires pose increasing threats to people and their property as communities develop in the wildland-urban interface. The wildland-urban interface refers to areas where structures and other human

development meet or intermingle with undeveloped wildland or vegetative fuels. The threat exists anywhere that structures are located close to natural vegetation and where fire can spread from vegetation to structures, or from structures to vegetation.

The three major factors that affect the occurrence and severity of wildland fires are:

- Fuels supporting the fire
- Weather conditions
- Topography in which the fire is burning

These factors affect and increase the likelihood of a fire starting, the speed and direction in which a fire will travel, the intensity at which it burns, and the ability to control and extinguish it. At the landscape level, both topography and weather are beyond our control. Fuel is the only factor influencing fire behavior that humans have the ability to manage. **Figure 29** shows wildland fire potential based on the fuel sources. Because this map uses a national dataset, the fire risk potential in the Badlands is low relative to the heavily forested and/or drier areas of the Mountain West, Pacific Northwest, and California. From a state and regional perspective, the study area has a relatively high potential for wildfires. The State of North Dakota 2024-2029 Enhanced Mitigation Mission Area Operations Plan shows that all four counties are at high risk for fires.

## Location

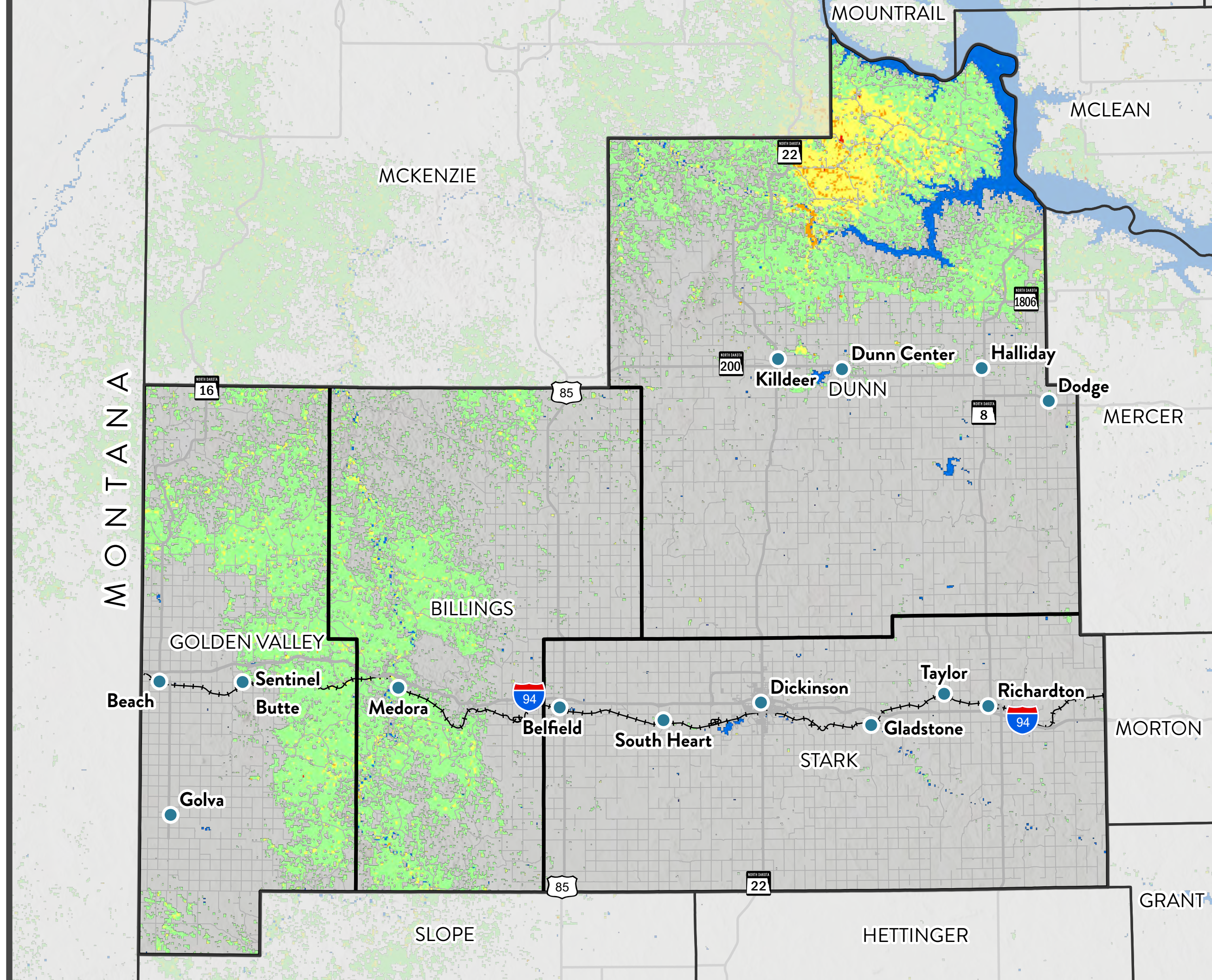
The entire non-urbanized part of the the four-county area is at some level of risk from wildland fire. Each city's wildland-urban interface is also at risk from wildland fire. Historically, the largest fires have occurred in Billings County and Dunn County. Large parts of these counties contain grasslands or shrub/scrub cover that provides fuel for wildland fires. The fire fuel model shows that the greatest risk is on the Fort Berthold Reservation in northern Dunn County, west of Lake Sakakewea.

**Figure 30** shows wildland fire events from 1988 through 2020. Note that this dataset excludes several significant fires from the last five years.

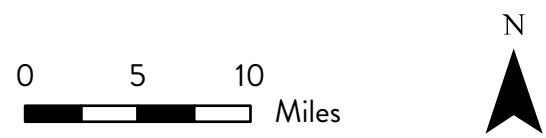
# 2025 Multi-Hazard Mitigation PLAN

Figure 29

## Wildland Fire Risk





Source: Rocky Mountain Research Station Wildfire Hazard Potential (WHP) dataset

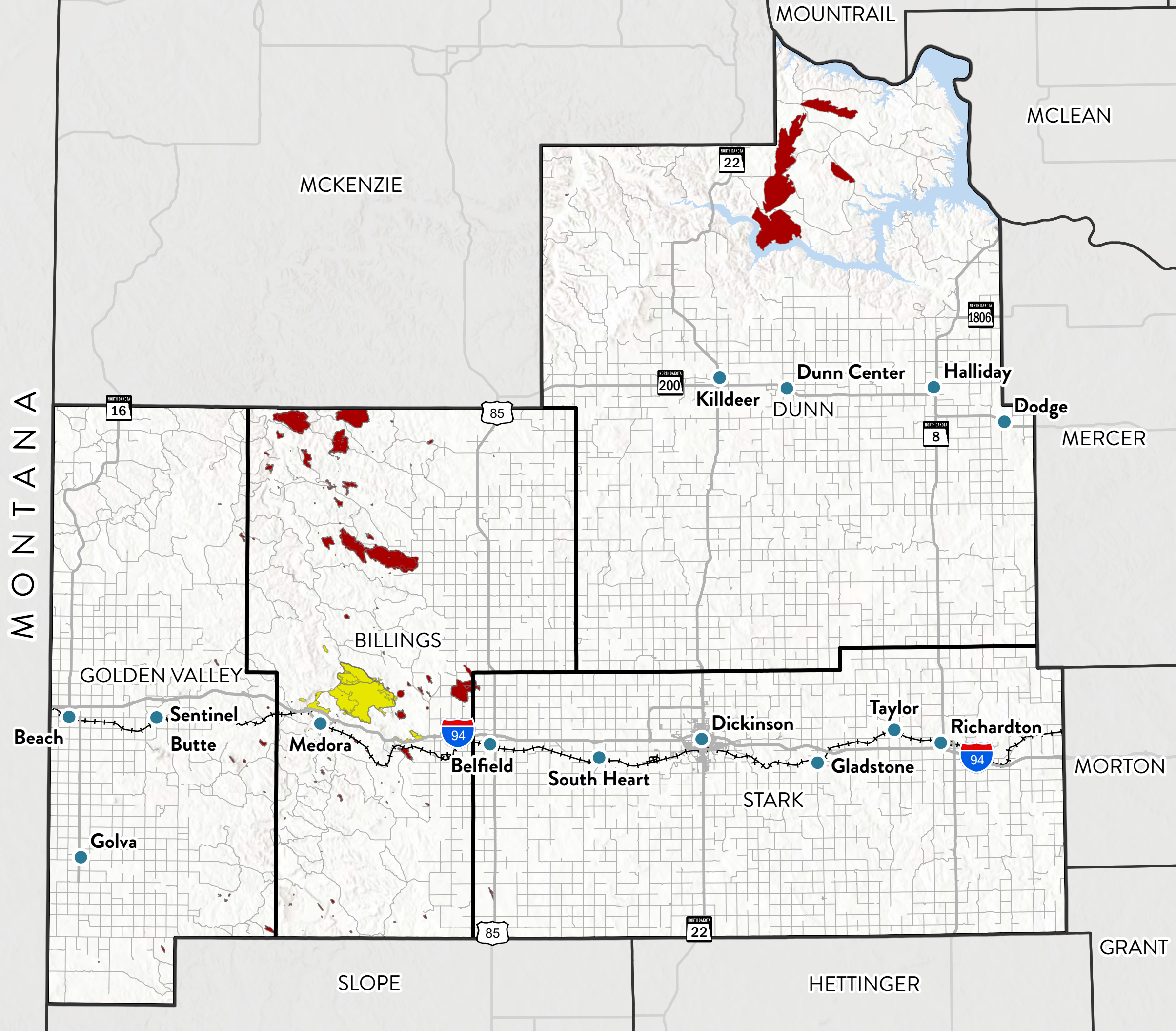


# 2025 Multi-Hazard Mitigation PLAN

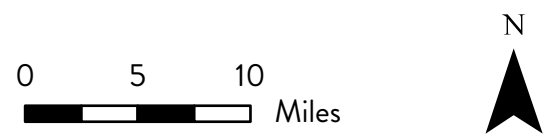
Figure 30

## Wildland Fire History

-  Wildfire
-  Prescribed Fire



Source: USGS Federal Wildland Fire Occurrence Database. Includes events from 1988-2020.



Notable wildland fires in the last five years include (excluded from Figure 22):

- **Medora Fire.** In 2021, this fire burned an estimated 2,300 acres southwest of Medora. Medora residents were evacuated and the National Guard was activated to help suppress the fire. The fire affected the Buffalo Gap Trail and Maah Daah Hey Trail and came close to the Burning Hills Amphitheater.
- **Elkhorn Fire.** In 2024, this fire near Grassy Butte burned an estimated 10,000 acres in McKenzie County and Dunn County. Local, state, and federal resources responded to the fire.
- **Bear Den Fire.** In 2024, this fire burned an estimated 13,500 acres on the Fort Berthold Indian Reservation near Mandaree in McKenzie County.
- **Little Swallow Fire.** In 2021, this fire burned approximately 9,800 acres on Fort Berthold Reservation, about six miles south of Mandaree.
- **Roosevelt Creek Fire.** In 2021, this fire burned more than 4,600 acres in the Little Missouri National Grassland north of Medora.

## Probability and Extent

According to USGS Federal Wildland Fire Occurrence Database, there were 382 wildfires from 1988 to 2020 – 12 per year, on average (**Table 40**). These fires consumed over 207,000 acres, or approximately 540 acres on average. Wildfire extent is determined by acres burned. The most significant wildfires in the region are generally Class F (1,000 to 4,999 acres) or Class G fires (5,000 to 9,999 acres). Twenty-two fires in the USGS dataset were Class F or larger, as were the four fires listed above.

**Table 40. Wildland Fire Events, 1988-2020**

| Fire Classification | Count      | Acres          | Average Acres |
|---------------------|------------|----------------|---------------|
| Wildfire            | 382        | 207,391        | 543           |
| Prescribed Burn     | 27         | 25,954         | 961           |
| <b>Total</b>        | <b>466</b> | <b>233,345</b> | --            |

Source: USGS Federal Wildland Fire Occurrence Database



*A growing wildfire engulfs part of the Badlands during the 2021 state of emergency, highlighting the potential severity of fires in dry, high-risk areas like the Medora Ranger District. (Image Credit: The Dickinson Press)*

The State’s 2024-2029 Enhanced Mitigation Mission Area Operations Plan included information about crop indemnity payments from the USDA Risk Management Agency. There were two wildland fire-related crop indemnity payments in Golden Valley for wheat in 2008 for a payment of \$16,529 for 156 acres.

In 2009 the North Dakota Forest Service developed a wildland fire risk assessment for every county in the state based on wildland fire occurrence, fire department response capabilities, and weather. The assessment ranked the four-county region as having a high risk for wildland fire. crop indemnity payments in Golden Valley for wheat in 2008 for a payment of \$16,529 for 156 acres.

## Vulnerabilities and Impacts

### Population

Populations that are vulnerable to wildfire could include the young, the old, rural, or urban. They include people who can't or won't control the start of wildfire or the spread of wildfire and those who may not report or escape from wildfire due to any number of reasons, including their ability to communicate clearly in English, who lack mobility, and/or who lack modern and resilient communications systems. The State's 2024-2029 Enhanced Mitigation Mission Area Operations Plan notes that wildfire risk is negatively correlated with population density, so rural areas are more vulnerable. Using data from the 2020 Census, the rural population of the study area is estimated at 9,417 people. Assuming 10 percent of the urban population is distributed within the wildland-urban interface (WUI), another 3,100 residents could be at greater risk of wildland fires.

### Property

Rural properties and remote infrastructure have a greater risk of exposure to wildfires. Rural farms, ranches, oil wells, agribusinesses, and residential uses other are scattered throughout the four-county area. Wildfires can result in extreme property loss for these isolated developments. FEMA's National Risk Index (NRI) estimates the value of buildings exposed to wildfire risk (**Table 41**). It also provides estimates for expected annual building loss, based on the historic loss

ratio for exposed buildings. Using this model, the expected annual cost of wildfire to buildings is approximately \$366,000 (2023 dollars).

**Table 41. Wildfire Building Exposure and Expected Annual Losses**

| County        | Wildfire Building Exposure Value | Expected Annual Building Loss |
|---------------|----------------------------------|-------------------------------|
| Billings      | \$169 million                    | 40,967                        |
| Dunn          | \$788 million                    | 268,989                       |
| Golden Valley | \$92 million                     | 7,624                         |
| Stark         | \$907 million                    | 48,907                        |
| <b>Total</b>  | <b>\$1.955 billion</b>           | <b>\$366,487</b>              |

Source: National Risk Index (2023)



### Risk Perception

Workshop participants perceived that future wildfires / urban fires are **very likely (4.45)** and that future impacts would be **significant (4.12)**.

### Critical Facilities

Chapter 2 describes critical facilities in the study area. Wildfires that spread to developed areas may directly burn down buildings, including hospitals, schools, or public safety facilities. More broadly, wildfires can impact water supply, energy transmission, and transportation systems. Wildfires can damage power lines, transmission towers, or substations; this is a potential concern, as fires can be sparked by these facilities. A sustained power outage would impact critical facilities from hospitals to water treatment plants. Fires

can also directly damage water pipes, pumps, and treatment facilities, if intense heat causes pipes to burst. Further, wildfires or smoke could force the closure of roads or bridges. A large fire could overwhelm local fire departments and impact their ability to respond to other needs.

## Future Conditions

Chapter 2 describes regional growth trends. Developing areas most susceptible to wildfire include Billings County/Medora and the northern portion of Dunn County. Medora is experiencing substantial investment in tourism attractions, lodging, and amenities.

Development that occurs near areas with potential fuel sources (dense vegetation/brush) would increase fire risk. Dunn County has experienced considerable oil and gas development, especially in its northern area. Additional development would increase potential losses in the event of a fire; fire risk could also increase as larger quantities of combustible material are handled.

Looking ahead, droughts are projected to increase in size, frequency, and duration. The expected increases in temperatures and frequency of droughts translate into an increase in the size, frequency, and intensity of both wildland and urban fires, with an added risk due to increasing development in the Wildland-Urban Interface. Also, water supplies used for fire suppression may become compromised during drought conditions. Meanwhile, rural fire departments across North Dakota are largely staffed by volunteers. As the frequency and intensity of wildfires are projected to increase, volunteer fire departments are projected to lose personnel strength due to general rural population declines and/or staff retirements. These trends will likely stress unit resources and increase fire response times.

# Technological & Human-Caused Hazards

Technological and human-caused hazards include hazardous materials release, transportation incidents, and dam failure. There is a considerable overlap between these hazards and several natural hazards described in the preceding section. For example, dam failure can be caused by geologic hazards or flooding. Similarly, severe winter increases the risk of transportation incidents.

## DAM FAILURE

### Overview

- **Billings**
  - Overall Risk: Low
  - Probability: Unlikely
  - Impact: None/Negligible
- **Dunn**
  - Overall Risk: Moderate
  - Probability: Unlikely
  - Impact: Moderate
- **Golden Valley**
  - Overall Risk: Low
  - Probability: Unlikely
  - Impact: None/Negligible
- **Stark**
  - Overall Risk: Moderate
  - Probability: Unlikely

- Impact: Significant

- **Primary Impacts:** Agricultural loss (crops/livestock), blocked or washed-out roads, economic loss, human loss and injuries, localized evacuation, power loss, property damage
- **Related Hazards:** Flooding, Geologic Hazards



A dam is defined as an artificial barrier across a watercourse or natural drainage area that may impound or divert water. The National Weather Service defines dam failure as catastrophic event characterized by the sudden, rapid, and uncontrolled release of impounded water. The effects of dam failure can be devastating to people and property downstream.

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

- Overtopping of a dam occurs when water from the reservoir spills over the top of the dam, creating instability in the structure. This can occur during a major flood event if the spillways are not adequately designed or if there is blockage in the spillway. Approximately 34 percent of all dam failures in the United States are due to overtopping.
- Foundation defects, including settlement and slope instability. Approximately 30 percent of dam failures are caused by foundation defects.
- Seepage from piping that reduces the dam structure's stability. About 20 percent of all dam failures in the United States are caused by piping seepage.
- Structural failure of materials used to construct the dam.
- Inadequate maintenance.

The North Dakota Department of Water Resources (DWR) regulates dams through the Dam Safety Program. All non-federally owned high-hazard and medium-hazard dams are periodically inspected to identify any needs for maintenance or repairs. Mitigation planning, repairs, and maintenance are the responsibility of the dam owner, but DWR has a cost-share program that provides assistance.

## EMERGENCY ACTION PLAN

Under North Dakota Century Code 61-03-25, Emergency Action Plans (EAPs) are required for all high-hazard and medium-hazard dams in the state. An EAP identifies the risks and impacts of dam failure for the individual dam and describes the course of action in the event of dam failure to minimize the loss of life and damage to property.

## Categorization and Location

The North Dakota Administrative Code establishes three categories for dam hazard potential:

- **High Hazard:** Dams where failure or misoperation will probably cause loss of human life. There is the potential for loss of more than a few lives if a dam in this category were to fail.
- **Medium (Significant) Hazard Dams:** Dams where failure or misoperation results in no probable loss of human life but can cause economic loss, disruption of lifeline facilities, or can impact other concerns.
- **Low Hazard:** Dams with low-hazard potential where failure or misoperation results in no probable loss of human life and low economic losses.

The North Dakota Department of Water Resources DWR maintains a database of dams. There are 84 dams in the study area (**Figure 31**), including four high hazard dams and three medium (significant) hazard dams (**Table 42**):

- **High Hazard Dams**

- **Beach Dam** is on the southwest side of the City of Beach. It impounds water from Beaver Creek and has a watershed area of approximately seven square miles. It is estimated that 23 structures would be impacted by dam failure.
- **Dickinson Dam** (Patterson Lake Dam) is in southwest Dickinson. It impounds water from the Heart River. The dam's normal pool covers approximately 1,190 acres. The dam is located upstream of much of the city, so the potential impact of dam failure would be large.
- **Lake Ilo Dam** is located approximately one mile west of the City of Dunn Center on the south side of Highway 200. It impounds water from Spring Creek. The dam's normal pool covers approximately 990 acres. It is estimated that a dam failure would inundate areas containing nearly 50 percent of the structures in Dunn Center, 80 percent of the structures in Halliday, and 10 percent of the structures in Dodge.
- **Queen City Dam** (Dickinson Dike) is adjacent to Turtle Park in Dickinson. It outlets into the Heart River just south of Dickinson Dam. Its location and small size suggest that dam failure would have minor impacts to downstream property.

**Table 42. High-Hazard & Significant-Hazard Dams in Study Area**

| Dam                       | County        | EAP | Owner             | Purpose      | Year Built | Max Storage (ac ft) |
|---------------------------|---------------|-----|-------------------|--------------|------------|---------------------|
| <b>High Hazard Dams</b>   |               |     |                   |              |            |                     |
| Beach Dam                 | Golden Valley | No  | City of Beach     | Recreation   | 1932       | 93                  |
| Dickinson Dam             | Stark         | Yes | City of Dickinson | Water Supply | 1950       | 38,770              |
| Lake Ilo Dam              | Dunn          | Yes | USFWS             | Recreation   | 1937       | 26,136              |
| Queen City Dam            | Stark         | No  | USBR              | Irrigation   | 1900       | 360                 |
| <b>Medium Hazard Dams</b> |               |     |                   |              |            |                     |
| Camel Butte Dam           | Golden Valley | No  | ND Game and Fish  | Recreation   | 1968       | 1,640               |
| Belfield Railroad Dam     | Stark         | No  | City of Belfield  | Recreation   | 1910       | 127                 |
| Gustafson Dam             | Dunn          | No  | Private           | Irrigation   | 1962       | 104                 |

Source: North Dakota Department of Water Resources



*Dam owners are responsible for repairs, maintenance, and mitigation planning. Repairs to Lake Ilo Dam in Dunn County were completed in 2024. (Image Credit: The Dickinson Press.)*

In addition to the previously described high hazard and medium (significant) hazard dams, the study area also includes several low head dams in the communities of Manning and Dickinson with several others along the Knife, Heart, and Green Rivers.

### Probability and Extent

According to the State’s 2024-2029 Enhanced Mitigation Area Operations Plan, there have been no occurrences of dam failure for high-hazard or medium-hazard dams to date, although there have been failures of low-hazard dams and events that caused damage to dams. None of these events occurred in the study area. The most common form of damage to high-hazard and medium-hazard dams is damage to their auxiliary spillways.

## Vulnerabilities and Impacts

### People and Property

The EAP inundation map for Dickinson Dam suggests that dam failure could inundate up to 32 blocks of residential development, approximately ten industrial structures, and a mobile home park. In addition, failure of the Dickinson Dam would likely also inundate a campground and a recreational vehicle park. The EAP inundation map for Lake Ilo Dam suggests that dam failure could impact up to five homes and outbuildings. The Beach and Queen City Dams have very low storage capacities, and it is thought that their failure would have very limited direct impacts on residents and property in Beach or Dickinson.

### Repetitive Loss / Severe Repetitive Loss Events

Properties which experience multiple flood-related damage events are a significant cost to the National Flood Insurance Program (NFIP) and should be prioritized for mitigation efforts. Billings County is the only county of the four-county study area that has a property which has experienced such an event. Billings County has one single-family residential NFIP Repetitive Loss Property in rural Billings County and zero severe repetitive loss properties. None of the four counties contain Severe Repetitive Lost properties.

### Critical Facilities

Dunn Center's sewage treatment lagoons may be affected by failure of the Lake Ilo Dam. No other critical facilities are anticipated to be impacted by failure of a high-hazard dam.

## Future Conditions

The expected increase in size, intensity, and frequency of both drought and heavy precipitation episodes, or an increased frequency in change between drought and flood intervals may put more dams at risk of scenarios that exceed the original design criteria of each respective dam. Aging dams are most at risk for this expected impact.

### REHABILITATION OF HIGH HAZARD POTENTIAL DAMS

FEMA's Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program provides technical, planning, design, and construction assistance for eligible rehabilitation activities that reduce dam risk and increase community preparedness. In order to qualify for assistance various HHPD qualifications must first be met, including inclusion of risks and vulnerabilities to and from HHPDs in a Multi-Hazard Mitigation Plan (MHMP). HHPD requirements are optional for MHMPs and have not been met for this document. The four-counties and their jurisdictions will seek to meet these HHPD requirements in future planning efforts.



### Risk Perception

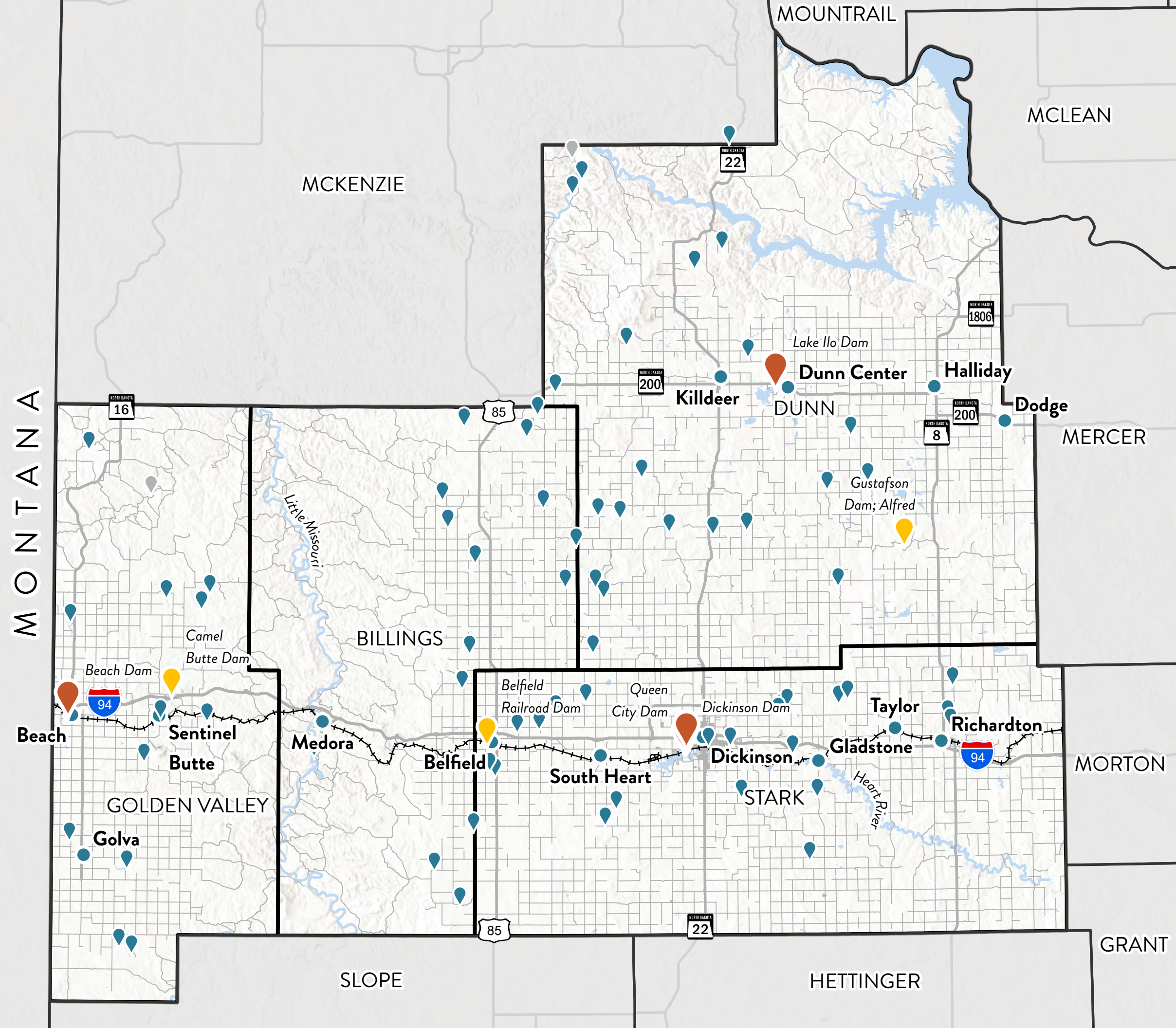
Workshop participants perceived that future dam failure is **unlikely (2.35)** and that future impacts would be **moderate (3.07)**.

# 2025 Multi-Hazard Mitigation PLAN

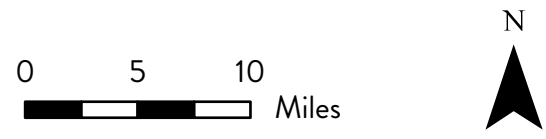
Figure 31

## Dam Hazard Potential

- High
- Medium
- Low
- Undetermined



Source: National Inventory of Dams



# HAZARDOUS MATERIAL RELEASE

## Overview

- **Overall Risk:** Moderate
- **Probability:** Likely
- **Primary Impacts:** Agricultural loss, human loss and injuries, increased stress on medical services, localized evacuation, permanent loss of business
- **Related Hazards:** None

A hazardous material is any substance that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. The study area includes numerous facilities to producing, refining, storing, and transporting oil, natural gas, and anhydrous ammonia. More recently, the State has explored carbon capture and storage. These hazardous materials and others present potential risks.



Hazardous materials incidents can occur at a fixed facility or while material is transported. Hazardous materials incidents at fixed sites are commonly caused by the improper storage, treatment, and disposal of hazardous waste.

**Crude oil** poses a significant risk due to its high flammability. It may release flammable vapors that increase the risk of explosion.

**Natural gas** is commonly used in North Dakota, often in its refined form of propane or butane. Propane and butane are generally transported as a liquid but will vaporize in the event of an unintended release. In their gaseous forms, both propane and butane they

heavier than air, and generally remain close to the ground. They are both highly flammable and present the risk of explosion.

**Anhydrous ammonia** is used in manufacturing, refrigeration, and fertilizer. It is often stored and transported as a pressurized liquid, but it will vaporize under normal pressure. Anhydrous ammonia has explosive potential, but it requires extremely high temperatures to ignite. It generally only produces a significant health hazard when released in poorly ventilated areas, but when exposed to moisture it can cause a low-lying ammonia fog.

## Location

Transportation-related hazardous materials incidents generally occur along major transportation routes such as highways, interstates, pipelines, and railroads. The study area includes numerous hazardous liquid and natural gas pipelines. (See Figure 3 in Chapter 2).

Oil and gas extraction and distribution networks are heavily concentrated in Dunn County. Natural gas processing plants are located in Billings, Dunn, and Stark Counties. The railroad passes through each city in Billings, Golden Valley, and Stark Counties, with the exception of Golva.

There are approximately 22,600 address points in the study area. Of these, more than 9,700 addresses (43%) are within 1 mile of the railroad and more than 6,600 addresses (29%) within 1 mile of an oil or gas pipeline.



*A workover rig near Killdeer. Industrial sites and transport facilities create a risk of hazardous material release. (Image Credit: The Fargo Forum)*

## Probability and Extent

The risk of hazardous materials release has increased substantially with the oil and gas development in western North Dakota.

Hazardous Materials incidents are catalogued by the National Responses Center, an interagency effort that is managed by the U.S. Coast Guard. There were 66 reported incidents from 2015-2024, broken down as follows:

- Billings County: 20
- Golden Valley County: 4
- Dunn County: 24
- Stark County: 18

Incidents most commonly involved fixed locations (24), pipelines (21), or mobile transport (18).

## Vulnerabilities and Impacts

### People

Exposure to crude oil through direct contact, inhalation, or ingestion can cause direct health effects, such as skin irritation, breathing difficulty, headaches, and nausea. Acute exposure may also lead to long-term complications such as lung, liver, or kidney damage, and increased cancer risk.

Exposure to propane and butane can also be a health hazard. Acute exposure can cause asphyxiation, respiratory irritation, and physiological damage; however, these effects are most likely to occur in enclosed spaces or areas with poor ventilation.

Effects of acute anhydrous ammonia exposure include severe irritation to the eyes, respiratory tract, gastrointestinal tract, and skin; severe repetitive exposure can cause permanent damage to these tissues. Anhydrous ammonia is not known to be carcinogenic.

### Property

A hazardous material release has the potential to cause significant damage to private property. Explosions, fires, or leaks from oil and gas infrastructure, pipelines, or transportation accidents can directly damage homes, businesses, vehicles, and agricultural equipment. Releases may also contaminate soil, surface water, and private wells, reducing the usability and value of property and, in severe cases, rendering land uninhabitable.

Beyond immediate physical impacts, hazardous materials can create long-term challenges for property owners. Contamination may require costly remediation, decrease property values, and restrict future land use or development. Evacuations and disruptions to transportation networks can displace residents and hinder access to

farms, ranches, and businesses, while agricultural producers face additional risks from loss of livestock, crops, and grazing land. Because nearly half of the region's address points are within one mile of a railroad or pipeline, the risk of private property being affected by a hazardous material release is widespread and substantial.

### Critical Facilities

Emergency facilities such as hospitals, fire stations, and law enforcement centers may be directly exposed to hazardous releases due to their proximity to rail lines, pipelines, or fixed oil and gas infrastructure. Even if not physically damaged, these facilities may face restricted access, require evacuation, or be forced to operate at reduced capacity due to contamination, power outages, or communication disruptions. Such impacts can hinder disaster response and slow recovery efforts when demand for emergency services is greatest.

Utility and infrastructure systems are also highly vulnerable to hazardous material incidents. A release could damage or disable power distribution, water treatment, and transportation networks, creating cascading effects that impact thousands of residents and businesses. Institutional facilities such as schools, daycares, and retirement homes may face heightened evacuation and sheltering challenges due to at-risk populations. In addition, recreation areas, historic landmarks, and cultural sites could suffer long-term environmental damage or closures, affecting community well-being and local economies which are highly reliant on tourism.

### Future Conditions

As described in Chapter 2, population growth for the four-county region will be dependent on both tourism as well as oil and gas extraction. Growth in oil and gas extraction, pipeline infrastructure,

and rail transport through the region will expand the volume of hazardous materials being produced, stored, and transported. As existing infrastructure ages and transportation networks become more complex, the potential for equipment failures such as pipeline ruptures or transportation accidents will rise.

Future climate conditions could cause both direct and indirect impacts to the possibility of a hazardous materials release. Warmer temperatures may directly result in the expansion of gases, increases in biologic agents, or other such actions that could put hazardous material storage containers, transporters, applicators (i.e., anhydrous), or facilities at an increased risk. Increased summer and winter storms, wildfires, floods, transportation incidents, etc. could also indirectly put hazardous material containers, transport, applicators (i.e., anhydrous), or facilities at an increased risk.



### Risk Perception

Workshop participants perceived future hazardous materials release is **very likely (4.23)** and that future impacts would be **significant (4.05)**.

# TRANSPORTATION INCIDENTS

## Overview

- **Overall Risk:** Low
- **Probability:** Possible
- **Primary Impacts:** Human loss and injuries; increased stress on emergency responders and medical services; localized evacuation
- **Related Hazards:** Hazardous Materials Release

## Location

The probability of a crash leading to fatality or serious injury increases exponentially with travel speed. Therefore, fatal and serious injury crashes are most likely to occur on state and federal highways. These roads also carry the highest volumes of traffic and substantial truck volumes, increasing the likelihood of crash that is compounded by the risk of hazardous materials release. There are 537 miles of state and federal highways in the study area. These highways include:

- Interstate 94
- US Highway 85
- State Highways 8, 16, 22, 200, and 1806

The BNSF railroad runs east-west through the length of the study area, crossing through Golden Valley, Billings, and Stark Counties. There are 67 railroad crossings. There are two grade-separated crossings in Dickinson – the Highway 22 underpass and the State Avenue overpass. The other 65 crossings are at grade. In urban areas, crossings have active warning devices such as flashing lights and gates. Rural crossings generally consist of passive devices such as

signs and pavement markings, which puts more responsibility on the driver. Many fatal crashes involve pedestrian trespass.

## Probability and Extent

The most common transportation incident is a multi-vehicle crash involving injury or death. There were 4,369 vehicle crashes from 2020-2024. Of these, 28 crashes caused at least one fatality, and 112 additional crashes resulted in at least one incapacitating injury (**Table 43 and Figure 34**). Based on these numbers, the study area averages 874 crashes per year, 5.6 of which are fatal.

**Table 43. Five-Year Crash Summary**

| County        | Total Crashes | Fatal Crashes | Serious Injury Crashes |
|---------------|---------------|---------------|------------------------|
| Billings      | 136           | 2             | 8                      |
| Dunn          | 509           | 6             | 26                     |
| Golden Valley | 96            | 3             | 5                      |
| Stark         | 3,628         | 17            | 73                     |
| <b>Total</b>  | <b>4,369</b>  | <b>28</b>     | <b>112</b>             |

Source: North Dakota Department of Transportation

The State’s 2024-2029 Enhanced Mitigation Area Operations Plan describes several notable transportation incidents that have occurred in North Dakota. None of these incidents occurred within the study area, but that does not mean that there is zero probability of a transportation incident. Throughout the state, there have been numerous transportation incidents involving buses, private aircraft, tractors, heavy commercial vehicles, trains, pedestrians, and other travel modes. In one of the most notable events in recent history, a train carrying crude oil collided with a derailed train west of Casselton

in rural Cass County, causing 476,000 gallons of crude oil to combust. Luckily, there were no injuries or fatalities, but 1,400 Casselton residents were evacuated, and damages were estimated at \$6.1 million.



*Transportation incidents involving freight trucks or train cars carrying oil, anhydrous ammonia, or other hazardous materials can lead to hazardous materials release. (Image Credit: The Dickinson Press)*

## Vulnerabilities and Impacts

### People

A transportation incident can directly impact people through fatalities, injuries, or long-term health effects. Large-scale crashes, derailments, or rollovers may result in mass casualty events, overwhelming local medical and emergency response capabilities, particularly in rural parts of the four-county region. Even smaller incidents can disrupt daily life by delaying commutes, limiting access

to essential services, and causing psychological trauma for those involved or living near the event. If hazardous materials are involved, residents may also face secondary health impacts from exposure, evacuation, or prolonged displacement.

Transportation incidents can also indirectly impact people by disrupting community lifelines. Extended highway or railroad closures can delay the delivery of food, fuel, and medical supplies, creating shortages that impact households and businesses. Collisions with livestock or wildlife may result in severe injuries for drivers and passengers, while also affecting agricultural producers who depend on livestock transport for their livelihoods. In all cases, the human impact of transportation incidents extends beyond immediate casualties to include lasting physical, emotional, and economic consequences for individuals and communities.

### Property

A transportation incident can cause substantial damage to property, including vehicles, cargo, and nearby infrastructure. A major highway or interstate crash involving freight vehicles carrying hazardous materials or a single train derailment with such materials can destroy personal property, damage businesses, and result in costly repairs to roadways, bridges, and rail lines. If hazardous materials are released, property damage may extend to homes, farmland, and equipment due to fire, explosion, or contamination, requiring extensive remediation and cleanup.

Indirect property impacts can also be significant. Extended transportation disruptions may delay the shipment of agricultural goods, manufactured products, and critical supplies, as well as hinder travel to and from tourist attractions such as Theodore Roosevelt National Park. These delays and lack of travel time reliability can create economic losses for property owners and businesses.

Additionally, collisions involving livestock or farm equipment can not only damage vehicles but also affect the value of agricultural property and operations. In rural communities where economic activity often relies on reliable transportation networks, the long-term consequences of property damage from a transportation incident can be especially severe.

### **Critical Facilities**

Access to hospitals, fire stations, schools, and utility systems can be severely impacted by transportation incidents. If a major highway or rail line is blocked, emergency responders may face delays reaching incident sites or providing care, reducing overall response effectiveness. Airports and rail yards, if affected, may also experience disruptions that ripple through the broader region. Indirect impacts can be just as significant with extended closures disrupting supply chains that hospitals, utilities, and schools depend on for fuel, medical supplies, and food. If hazardous materials are involved, critical facilities located nearby may face evacuation, contamination, or restricted access. Such disruptions limit the ability of these facilities to maintain essential services and can slow community recovery following a large-scale transportation incident.

### **Future Conditions**

Future climate conditions and population growth are expected to increase the likelihood of transportation incidents in Billings, Dunn, Golden Valley, and Stark Counties. More frequent and severe weather events, including heavy snowfall, flooding, high winds, and extreme heat, will place added stress on transportation infrastructure and create hazardous driving conditions. These weather-related challenges will increase the risk of crashes, vehicle pileups, and derailments, particularly on rural highways and rail lines that already operate with limited redundancy.

Population growth and continued oil, gas, and agricultural development will also contribute to higher traffic volumes on regional highways, greater reliance on freight and hazardous materials transport, and more frequent interactions between passenger vehicles, freight trucks, farm equipment, and livestock. This growing demand raises the potential for accidents and mass casualty events while also increasing the strain on emergency response resources. Taken together, these factors suggest that without proactive mitigation, the likelihood and severity of transportation incidents in the region will continue to rise.

# 2025 Multi-Hazard Mitigation PLAN

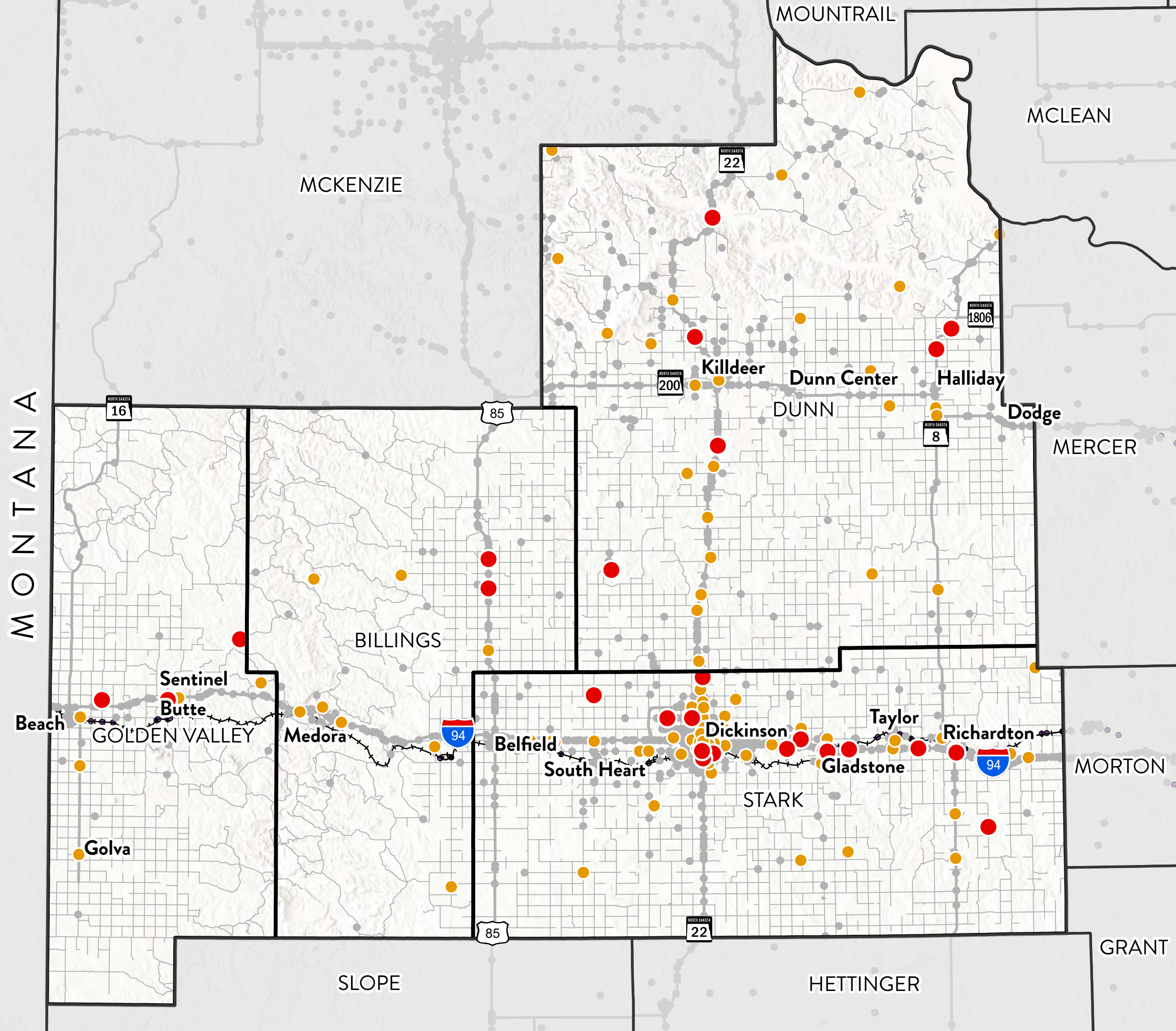
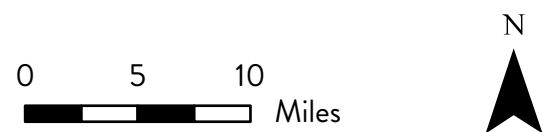
Figure 32

## Crash History

Crash Severity

- Fatal (28)
- Incapacitating Injury (112)
- Other (4,229)

Source: North Dakota Department of Transportation. Crashes for the years 2020-2024.



## INFECTIOUS DISEASE & PEST INFESTATION

### Overview

- **Overall Risk:** Low
- **Probability:** Possible
- **Primary Impacts:** Agricultural loss; economic disruption; human loss and injuries; increased stress on medical services; permanent loss of business
- **Related Hazards:** Terrorist / Nation-State Attack; Drought

### Infectious Diseases

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



There are numerous ways for Infectious disease to spread among humans: physical contact with an infected person, contact with a contaminated object, bites from animals or insects carrying the disease, or through the air. A widespread occurrence of infection in a community is called an epidemic. Epidemics may lead to quarantines, school and business closures, and stress on medical facilities. A widespread epidemic (often countrywide or worldwide in scope) is referred to as a pandemic.

## COVID-19 PANDEMIC

Following the previous MHMP update, Covid-19 emerged as a significant health threat. The global and local impacts of the pandemic were as catastrophic as any hazard discussed in this Plan, with enormous costs to public health, medical systems, education systems, and the global economy. **According to the North Dakota Department of Health and Human Services (NDDHS), 282,456 cases of Covid-19 were reported in 2020, resulting in 2,902 hospitalizations and 2,066 deaths in North Dakota.** NDDHS reports that vaccines reduced the rate of infection by 50 percent and reduced hospitalizations by up to 66 percent.



*Drive-thru Covid-19 testing in Dickinson. (Image Credit: The Dickinson Press)*



According to the State's 2024-2029 MAOP, there are 75 infectious diseases among humans that can lead to death or serious illness. Vaccines have been developed for roughly 20 of these that can increase resistance to contracting the disease or reduce symptoms if the disease is contracted. In addition to Covid-19 and more common strains of the flu and pneumonia, other infectious diseases/events of note include:

- The recurrence of measles, which spread to Williston and the surrounding area in 2025;
- The resurgence of anthrax in cattle which spread to Stark County in 2025. Anthrax is caused by the bacteria *Bacillus anthracis*. The bacterial spores can lie dormant in the ground for decades and become active under ideal conditions, such as heavy rainfall, flooding and drought. Animals are exposed to the disease when they graze or consume forage or water contaminated with the spores.
- Malaria, which is increasingly transmissible due to foreign travel;
- Sexually-transmitted diseases;
- Food-borne illnesses, such as E. coli;
- Avian flus, swine flu, and other animal diseases that have leapt or may have the potential to mutate and leap to humans; and
- Various plant diseases, which can impact North Dakota's agricultural industry and are more common in drought conditions.

The watchlist of emerging threats includes Lyme disease, which is spread by deer tick bites, West Nile virus, which is spread by mosquitoes, and Mpox (monkey pox); these diseases have occurred in North Dakota but are not currently prevalent.

## Pest Infestations

A pest infestation is a sudden increase in destructiveness or population numbers of a pest species in a given area, according to the European Environment Information and Observation Network.

Pests common to North Dakota wheat include aphids, armyworms, cutworms, moths, and grasshoppers. These pests are also common to corn, as are rootworms, spider mites, and the European corn borer.

Grasshoppers are a common menace to North Dakota farmers and recreationalists – so much so that they inspired an art installation, *Grasshoppers in the Field*, in Stark County. Across the state, the percentage of fields reporting grasshoppers increased from 28 percent in 2017 to 65 percent in 2021, according to NDSU Extension.

The emerald ash borer was found in LaMoure County in 2024 but has not made its way to the western part of the state. This insect is expanding its range at about one mile per year, but can travel hundred of miles if transported by humans.

## Invasive Weeds

Noxious and invasive weeds are a concern due to their potential to limit the economic productivity of cropland and pasture land. The North Dakota Department of Agriculture designates 13 species for statewide control and additional four additional species of local concern.

The state-listed species are:

- Abisnth Wormwood
- Canada Thistle
- Dalmation Toadflax
- Diffuse Knapweed
- Houndstongue

- Leafy Spurge
- Must Thistle
- Parmer Amaranth
- Purple Loosestrife
- Russian Knapweed
- Saltcedar
- Spotted Knapweed
- Yellow Toadflax

Additional species of local county concern are:

- Black Henbane
- Common Burdock
- Hoary Cress
- Common Mullein

## Location

The most likely locations for infectious disease, pest infestation, and invasive weed outbreaks in Billings, Dunn, Golden Valley, and Stark Counties are areas where people live, gather, or interact closely with the natural and agricultural environment. Long-term care facilities, nursing homes, assisted living centers, schools, childcare centers, correctional facilities, and healthcare centers are especially vulnerable to infectious diseases and pests due to close living quarters, high interaction rates, and the presence of at-risk populations. In rural areas, farms and ranches are also at heightened risk, where people may be exposed to both zoonotic diseases and pest-related health issues tied to rodents and insects.

Invasive weeds present a related challenge, particularly in agricultural fields, rangelands, and recreation areas. These weeds can reduce crop yields, degrade grazing land, and increase allergens in the environment, creating indirect health effects for farmers, ranchers,

and outdoor recreation users. The combination of dense human activity in communal living facilities and agricultural exposure in rural landscapes makes these locations the most likely to experience outbreaks of infectious diseases, pest infestations, and invasive weeds across the four-county region.

## Probability and Extent

The probability of infectious disease outbreaks in the four-county region is moderate to high, given the concentration of vulnerable populations in long-term care facilities, schools, and correctional institutions, as well as the mobility of residents for work, healthcare, and recreation. Seasonal illnesses such as influenza, RSV, and gastrointestinal infections occur annually, while more severe outbreaks, such as COVID-19, remain possible though less frequent. The extent of such outbreaks can range from localized impacts in a single facility to region-wide public health emergencies that strain medical capacity.

Pest infestations have a moderate probability of occurrence, with impacts typically localized to residential housing, schools, or communal living environments. Outbreaks may affect dozens to hundreds of individuals, depending on the setting and severity, and can cause both acute health issues (e.g., allergic reactions, asthma triggers, disease transmission) and long-term stress for affected populations.

Invasive weeds are an ongoing and highly probable hazard across agricultural and rangeland areas. While their impacts are less acute to human health than infectious disease or pests, they can affect large geographic areas over time. Their extent is typically countywide or regional, as infestations spread across farmland, pastures, and recreation areas, indirectly impacting people through reduced

agricultural productivity, economic losses, and heightened allergen exposure.

## Vulnerabilities and Impacts

### People

Populations most vulnerable to infectious diseases include children, the elderly, and individuals with preexisting health conditions. Residents in long-term care facilities, schools, childcare centers, and correctional institutions face elevated risk due to close living quarters and frequent interaction. Outbreaks can lead to widespread illness, hospitalization, and, in severe cases, fatalities. Indirect impacts include social disruption from quarantines, school closures, and workforce shortages, which place strain on households and essential services. The potential impact on people is high, with both localized outbreaks and region-wide health emergencies possible.

Pest infestations also affect vulnerable populations, particularly children, the elderly, and those with respiratory conditions such as asthma. Infestations in homes, schools, or communal living facilities may cause allergic reactions, skin irritation, and transmission of diseases carried by insects or rodents. The psychological effects of infestations, including stress and anxiety, can further reduce quality of life. The overall impact on people is moderate, typically localized but with the potential to affect dozens to hundreds depending on the severity and location of the outbreak.

While invasive weeds primarily impact agriculture and ecosystems, they also can affect people through indirect health and quality-of-life consequences. Certain weeds increase allergen exposure, worsening conditions such as hay fever or asthma. Widespread infestations may also reduce the productivity of farmland and grazing land, indirectly affecting people through economic hardship for farm families and

higher food costs. While the direct health impact on people is low, the indirect and long-term impacts are moderate due to reduced well-being and livelihood security in agricultural communities.

### Property

Infectious disease outbreaks generally have limited direct impacts on property, but indirect effects can be significant. Quarantine measures, closures of businesses, and reduced workforce availability can delay property maintenance and lead to disrepair. In agricultural areas, diseases affecting livestock may lower the value of farm property and related equipment if operations are scaled back or suspended.

Pest infestations, by contrast, can cause direct and visible property damage. Rodents, insects, and other pests may damage homes, schools, and commercial buildings by chewing wires, insulation, or structural materials, leading to costly repairs. Infestations can also reduce property values and make affected facilities uninhabitable or unsanitary until remedial measures are taken.

Invasive weeds affect property primarily through agricultural and rangeland degradation. Infestations can reduce crop yields, lower pasture quality, and diminish the overall productivity and value of farmland. Weeds that spread into residential areas or public spaces may also require costly eradication or control measures, placing a burden on both private property owners and local governments.

### Critical Facilities

Infectious disease outbreaks can disrupt the operations of critical facilities by straining hospitals and public health systems, overwhelming staff capacity, and limiting available resources. Schools, government offices, and emergency services may face temporary closures or reduced staffing, affecting their ability to provide essential services. In extreme cases, absenteeism among staff could weaken

emergency response capabilities or delay essential facility maintenance and operations.

Pest infestations also present risks to critical facilities, particularly healthcare, educational, and food-related facilities where sanitary conditions are paramount. Rodents or insect infestations can compromise food storage, spread allergens, and create unsafe or unsanitary conditions, potentially requiring temporary closures for mitigation. Facilities that house vulnerable populations, such as nursing homes or schools, are particularly at risk if infestations are not addressed quickly.

Invasive weeds primarily affect facilities that manage large tracts of land, such as schools, parks, or government-owned properties. While less immediately disruptive than disease or pests, unmanaged weed growth can damage landscaping, increase fire risks, and create additional maintenance burdens. For facilities dependent on agriculture or rangeland such as university extension offices, fairgrounds, or county-managed lands, weed infestations can reduce usability and productivity, leading to long-term management costs.

### Future Conditions

Future growth and development can be expected to increase risks for infectious disease and pest infestation. For example, increased economic activity and migration to the region could create more pathways for invasive species and vector-borne disease.

North Dakota should expect larger, more frequent, and more intense outbreaks of certain infectious diseases and pests, though some human and animal diseases may decrease in occurrence. As a result of slightly warmer and longer summers, more pests and invasive weeds will be able to thrive and spread, contributing to increases in insect populations and certain vector-borne diseases such as West Nile disease. Somewhat shorter and less cold winter seasons could

also lead to decreased incidents of certain infectious diseases among both human and animal populations during this period, depending on how and where population growth (or withdrawal) and development occur.



### Risk Perception

Workshop participants perceived future infectious disease or pest outbreak is **possible (2.92)** and that future impacts will be **moderate (2.98)**.

## Adversarial Threats

Adversarial threats include civil disturbance, criminal attacks, cyber-attacks, terrorist / nation-state attacks, and infectious disease / pest infestation.

### CIVIL DISTURBANCE

#### Overview

- **Overall Risk:** Low
- **Probability:** Possible
- **Primary Impacts:** Human loss and injuries; increased stress on emergency responders and medical facilities; property damage
- **Related Hazards:** Terrorist/Nation State Attack, Cyberattack

Civil disturbances can occur when large groups, organizations, or distraught individuals act with potentially disastrous or disruptive results. Many issues can cause civil disturbance, but most are due to political grievances, economic disputes or social discord, terrorism, or foreign agitators. Additionally, civil disturbance can result following a disaster that creates panic in the community. Civil disturbances are criminal actions that are not protected by the First Amendment. Forms of civil disturbances may range from groups blocking sidewalks, roadways, and buildings, to mobs rioting and looting, to gang activity. They can be either spontaneous or planned events.



The Standing Rock protests over the Dakota Access Pipeline are perhaps the most noteworthy example of civil disturbance in recent

history. From August 2016 through March 2017, the protests escalated from peaceful civil disturbance to unlawful assembly, as participants engaged in violent acts including the deployment of improvised explosive devices, killing and taking cattle, throwing of incendiary devices, and the intentional ignition of wildfires and vehicle fires. According to the State's 2024-2029 MAOP, Morton County suffered \$40 million in costs for law enforcement, infrastructure repair, cleanup, and prosecutions.

#### Location

While any location can become the scene of a civil disturbance, areas where large crowds gather could present a greater risk. Within the study area, such locations could include landmarks, critical infrastructure, or courthouses. Organized events could become sites for demonstrations that lead to civil disturbance. Historically, prisons have been the site of civil disturbances. The Dickinson Adult Detention Center (DADC) is the primary correctional facility in the region. As the largest city in the region, Dickinson is perhaps the most likely site of civil disturbance.

#### Probability and Extent

The State's 2024-2029 MAOP finds that civil disturbances will likely occur in the future, noting that civil disturbances have increased in recent years due to 2020 election results, reproductive rights, and human rights. Social media is an accelerant, given its enormous influence over tribal politics.

## Vulnerabilities and Impacts

### People

Those participating in or impacted by acts of civil disturbance can suffer injury or death. To date, however, North Dakota has not recorded a fatality due to civil disturbance.

### Property

Civil disturbance frequently results in property damage, which could be in the form of graffiti, broken windows, or façade damage, as occurred in Fargo during the civil disturbance over the killing of George Floyd. Within the study area, the extent of damage would likely be greatest in an urban setting, such as downtown Dickinson.

### Critical Facilities

Civil disturbances stress community lifelines, including law enforcement and EMS. When responders are focused on the disturbance, they have less ability to respond to other community needs. Small communities have fewer resources to respond to civil disturbances and other needs. While they can draw on mutual aid, this leads to a delayed response and still pulls resources from other focuses.

### Future Conditions

Future development is not likely to impact the risk of civil disturbance. Civil disturbances are rooted in any number of causes, including economic hardship, social injustices, political grievances, or responses to criminal attacks. Given ongoing political divisions, the probability of protests may be expected to increase, increasing the potential for riotous behavior.

There is no known direct connection between future climate conditions and civil disturbance, though some research links the effects of climate change anxiety to an increasing intensity of civil disturbance in a variety of developing and developed countries. And research shows that increased heat stress, along with increased summer and winter storms, wildfires, floods, transportation incidents, etc. could increase social unrest, which could encourage general civil unrest. Likewise, there is an increased risk of civil disturbances targeted toward the oil and gas industry in North Dakota from growing public concern over potential impacts of climate change.



### Risk Perception

Workshop participants perceived that risks from civil disturbance, criminal attacks, cyber-attacks, and terrorist/nation-state attacks are **possible (3.08)** and that future impacts would be **moderate (3.34)**.

## CRIMINAL ATTACK

- **Overall Risk:** Low
- **Probability:** Possible
- **Primary Impacts:** Human loss and injuries; increased stress on emergency responders and medical facilities; property damage
- **Related Hazards:** Terrorist/Nation State Attack, Cyberattack

A criminal attack is an act of violence or attack by physical force on a person or people for which the attacker is liable to criminal prosecution. Examples of criminal attack include mass shootings, gang activity, drug activity, human trafficking, and hate crimes. Often, state and federal governments are involved in monitoring, response, and enforcement.



The State's Enhanced Mitigation Area Operations Plan describes several notable and recent events of criminal attacks in North Dakota. A few occurred in or related to the study area:

- Violent crimes and gang activity rose in western North Dakota during the oil boom. In July 2013, 10 to 20 members of Country Boy Crips street gang relocated from Bakersfield, California to Dickinson. A related revenge shooting in Minot and 22-arrest drug sting occurred in 2013 and 2015, respectively.
- In October of 2020, Anthony Raymond, a member of the Proud Boys, was arrested for threatening to bomb a polling location in Stark County.

## Location

Broadly, criminal attacks can occur anywhere in the state and study area. However, they are more likely to occur in larger population centers. Additionally, there was a noted increase in crime in the Bakken during the oil boom. Based on statewide statistics, Dunn County and Stark County are relatively more susceptible to criminal attacks than Billings County and Golden Valley County.

## Drug Cases

The State's 2024-2029 Enhanced Mitigation Area Operations Plan identifies the top-ten county jurisdictions with the most drug cases per 1,000 residents for the year 2022. Dunn County is seventh on the list with 7.15 cases and 3.45 arrests per 1,000 people. No other county in the study area is in the top ten.

## Human Trafficking

Human trafficking includes sex trafficking, labor trafficking, and human smuggling. The North Dakota Human Trafficking Task Force (NDHTTF) monitors human trafficking throughout the state. Their 2020 report shows statewide locations where there are known human trafficking victims. There was one case near Dickinson, three cases in Golden Valley County, and two cases in eastern Stark County or western Morton County.

## Hate Crimes

The United States Department of Justice (DOJ) defines hate crimes as crimes committed on the basis of the victim's perceived or actual race, color, religion, national origin, sexual orientation, gender, gender identity, or disability. The DOJ reports 78 crimes in North Dakota from 2021-2023. Fifty-seven (73 percent) targeted the person's race,

ethnicity, or ancestry. From 2020-2021, there were four hate crimes in the study area – three in Dickinson and one in Golden Valley County.

## Probability and Extent

While criminal attacks can and do occur throughout the state, there are limited examples from the study area. However, statewide statistics provide helpful context for understanding broad trends.

### Violent Crimes

The State Attorney General's Office and Bureau of Justice track crimes across the state. As described in the State's 2024-2029 Enhanced Mitigation Area Operations Plan, the rate of violent crimes increased from 2019-2022 compared to 2016-2021. Extortion/blackmail increased by 30.5 percent, homicides increased by 21.6 percent, and arson increased by 20.3 percent.

### Drug Cases

According to the State Attorney General's Office, marijuana (47.6 percent) and methamphetamines (30.2 percent) make up the majority of drug seizures, although seizures steadily decreased from 2018-2022. Meanwhile, opioid seizures are increasing. According to the Kaiser Family Foundation, about 124 North Dakotans die each year from opioid use/misuse, while 3-4 percent of North Dakotans acknowledge opioid misuse over the course of a year.

## Vulnerabilities and Impacts

### People

Criminal attacks can directly lead to human loss and injuries. In addition, traumatic events may produce lingering and compounding impacts, including PTSD, depression, anxiety, substance abuse, avoidance, or aggression, which can affect the victim's relationships,

schooling, or work. This can also lead to suicidal behavior. North Dakota's number of alcohol-related deaths, suicides, and fatal drug overdoses have all increased in the past five years, as described in the State's 2024-2029 Enhanced Mitigation Area Operations Plan. Law enforcement officers and first responders who put their lives on the line may be killed, injured, or traumatized by criminal attacks.

### Property

Property damage can occur during criminal attacks. In addition to physical damage, property can suffer reputational damage.

### Critical Facilities

A criminal attack at a critical facility could produce immediate and longstanding effects. As noted above, schools targeted by mass shootings can suffer reputational damage, with victims forever associating traumatic memories with the place.

A mass casualty event could overwhelm hospitals or paramedics. There are limited responders and medical services in the four-county area, which may lead to response delays.

Increased crime or the threat of crime may lead to increased spending on law enforcement, correctional facilities, or security features at public buildings and venues. Criminal attacks have been launched for the purpose of impacting government operations, although that has not occurred in North Dakota.

### Future Conditions

Crimes associated with urban areas will likely increase as cities grow. In addition, cities experiencing growth can expect a corresponding increase in the provision of law enforcement, fire protection, and other services. Dickinson is the largest city in the study area and has the most growth potential. Stark County is expected to grow by about

10,000 residents from 2025 through 2040. (See Table 3 for county population projections.)

There is no known direct connection between future climate conditions and the location, extent, intensity, or duration of specific criminal threats, though indirect connections are possible. For instance, future climate would not necessarily promote or prevent a specific threat, while a specific weather episode may help to delay or advance such actions. And Increased heat stress, along with increased summer and winter storms, wildfires, floods, transportation incidents, etc. could increase social unrest, which could encourage increased criminal threats.

# CYBERATTACK

## Overview

- **Overall Risk:** Moderate
- **Probability:** Likely
- **Primary Impacts:** Financial losses; impacts to businesses and institutions; impacts to critical facilities and response capabilities.
- **Related Hazards:** Criminal Attack

A cyberattack is any kind of malicious activity that attempts to collect, disrupt, deny, degrade, or destroy digital information or information networks. Computer security incidents are an ongoing threat and require due diligence to mitigate any potential disruption to critical infrastructure. **Common methods include malware, ransomware, and phishing.**



According to the Department of Homeland Security's Cybersecurity and Infrastructure Security Agency (CISA), malware is any software used to gain unauthorized access to information technology (IT) systems to conduct a cyberattack. Ransomware is malware that holds systems or data captive for payment. Phishing is an online scam enticing users to share private information through deceitful or misleading tactics, often via email or text message.

CISA also monitors advanced persistent threats (APTs). An APT is a well-resourced adversary engaged in sophisticated malicious cyber activity that is targeted and aimed at prolonged network/system intrusion. APT objectives could include espionage, data theft, and network/system disruption or destruction. These threats typically target multiple employees.

## CYBERATTACK PREVENTION STRATEGIES

When cyberattacks occur, it is critical to communicate the threat before the attacker moves on to other victims. As technology evolves and cyberattacks become more sophisticated, upgrading software and hardware is crucial to enhance security. Multifactor authentication is one security tool that makes it much harder for unauthorized individuals to access information, even if one factor is compromised. Penetration testing (pen testing) is another security measure that uses simulated cyberattacks to detect vulnerabilities.

## Location

Cyberattacks occur in digital space. Therefore, any computer or device connected to the internet is a potential target. However, certain industries and organizations are more likely to be targeted, including financial institutions, school systems, health care systems, and energy providers. According to the State's 2024-2029 Enhanced Mitigation Area Operations Plan (MAOP), several large-scale cyberattacks occurred in North Dakota over the previous decade, including:

- In October 2014, a malware breach in the North Dakota University System exposed information about 290,000 students (current and former) and 780 faculty and staff.
- In February 2018, there were malware attacks on one-third of the K-12 schools in the state. It took 45 days to completely clean the school system's network.
- In May 2020, the state's largest fiberoptic network, Dakota Carrier Network, was hit with a ransomware attack.

- In April 2022, North Dakota’s Adaptive Health Integrations, which provides billing software for the medical industry, was attacked. Personal data for more than 500,000 people may have been accessed, including Social Security numbers.
- In October 2022, a ransomware attack on CommonSpirit Health forced rescheduled surgeries and appointments. CHI St. Alexius Health was one among the hospitals that was hit in the attack. It took five days to restore regular business.

## Probability and Extent

The probability of cyberattacks is increasing as technology becomes more sophisticated and technological dependence increases. From 2021 to 2031, ransomware attacks are expected to increase five-fold, according to the State’s 2024-2029 MAOP. The United States is the preferred target of cybercriminals, receiving 46 percent of all attacks in 2021. It is highly probable that North Dakota will be impacted by a cyberattack. Cyberattacks may directly target agencies or companies that are headquartered within the four-county region. However, as shown above, it is also probable, perhaps more so, that residents’ data will be exposed through a large-scale, coordinated attack on statewide or national systems.



**Image Source: Unsplash.com**

Phishing is the most common cyberattack. In 2021, about 324,000 people worldwide fell victim to phishing attacks, with total damages exceeding \$44 billion. In 2022, about three percent of North Dakota’s residents were victimized (over 23,000 residents).

Ransomware demands are also increasing, averaging over \$220,000 per attack in 2021, according to the State’s 2024-2029 MAOP. In 2021, 37 percent of all businesses and organizations were targeted by ransomware.

## ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is evolving rapidly as nations and technology firms compete for prominence. AI efficiencies will heighten cyberattack risks but could also help companies and organizations improve their security systems.

## Vulnerabilities and Impacts

Impacts can be measured in terms of financial cost or economic losses. According to the FBI Internet Crime Complaint Center, North Dakota leads all states with the largest average loss per cybercrime at \$37,711 per scam.

### People

Aging residents (e.g., 65-plus) are the most targeted group for cybercrime and are highly vulnerable, since individuals may not be as familiar with potential risks and may have more assets/wealth to exploit than younger demographics. Geographically, Stark County is most vulnerable, given its large population and high rate of internet access (above 90 percent).

### Property

Past cyberattacks have targeted pipelines, electrical utilities, and water suppliers. The vital importance of these facilities makes them prime targets for cybercriminals. Older systems that utilize outdated or unsupported technologies would be at greatest risk. Southwest Water Authority (SWA), which provides rural water for much of the study area, has taken numerous steps to harden its infrastructure from cyberattack.

### Critical Facilities

As noted previously, successful cyberattacks have impacted the delivery of health care in North Dakota. The state is particularly vulnerable given the small number of health care providers. The Sanford Hospitals and CHI-St. Alexius provide health care to much of the region through their branches in Dickinson, Watford City, and Williston. In the event of a successful cyberattack on one of these networks, there would be impacts throughout the region. Likewise, an

attack on fire departments, police departments, or emergency medical services would increase response times and hinder the ability to provide emergency services.

### Future Conditions

Our society is increasingly reliant on the internet. Most future developments will have internet access, putting future residents and businesses at risk of cyber-attacks, regardless of where they are located.

There is no known direct connection between cyber-attacks and future climate conditions, though attackers may take advantage of inclement weather periods and other social, infrastructure, or economic stressors to mask or otherwise facilitate their attacks.

# TERRORIST OR NATION-STATE ATTACK

## Overview

- **Overall Risk:** Low
- **Probability:** Unlikely
- **Primary Impacts:** Economic disruption; human loss and injuries; increased stress on medical services; localized evacuation.
- **Related Hazards:** Criminal Attack, Cyberattack

Terrorist or nation-state attacks are designed to harm a particular group of people or force political action. Such attacks may use chemical, biological, radiological, explosive, or nuclear weapons, in addition to armed assault. Terrorist attacks may be committed by a foreign or domestic group, or by a “lone wolf.” A nation-state attack originates from a foreign government. This may include state-sponsored cyberattacks, which are discussed in the preceding section. In general, the goal of a terrorist or nation-state attack is to intimidate, coerce, or influence the civilian population or government into taking an action or choosing not to take an action.

## Location

A nation-state attack would likely target American military targets, federal buildings, or targets that would impact the national economy. Within the study area, high-value energy production or agricultural sites could be targeted. North Dakota ranks second in the nation in total energy production and ranks third for oil production. Energy facilities or agricultural sites in the study area could be potential targets; however, given the state’s central location and rural location, this seems like a remote possibility.

A foreign-based terrorist attack would most likely target a border port of entry, airport, airplane, or large population center. Within the study area, the Dickinson-Theodore Roosevelt Regional Airport is one possible target, but again, this seems unlikely, given that the wide availability of more accessible, higher-profile targets elsewhere in the country.

## Probability and Extent

The North Dakota State Local and Intelligence Center (NDSLIC) monitors terrorism and suspicious activities in the state and serves as a resource to local law enforcement. From 2018-2022, the NDSLIC reported 10 Terrorism Screening Encounters, including one in Stark County, according to the State’s 2024-2029 MAOP. Most of these screenings occurred at airports. In addition, the NDSLIC sent 27 reports of a possible nexus to terrorism to the FBI. Overall, these encounters decreased substantially from the prior reporting period (2014-2017).

## Vulnerabilities and Impacts

Terrorists and nation-state attacks usually occur without warning, as the goal of the attack is to inflict as much damage as possible before governments and law enforcement can respond. This increases the extent of damage.

## People

In many terror or nation-state attacks, the public has been the primary target. Often, the intent is to inflict as much violence as possible. Attacks also affect the physical, mental, and emotional health of survivors and the broader public, who may fear a repeat attack.

Socially vulnerable groups such as ethnic, racial, or religious minorities are the most likely targets of domestic terrorism, while a foreign-based attack, such as the September 11 attacks, might be more indiscriminate.

Immediately during an attack, children, the elderly, and disabled persons would be highly vulnerable. First responders are also highly vulnerable, particularly if they arrive on the scene while violence is still unfolding or are called in to negotiate.

### Property

Property owned or catering to vulnerable groups may be targets for extremism, as can locations that serve as large gathering points. Extremist vandalism can leave a lasting impression on communities and may be an indicator of future attacks. Infrastructure in remote locations, including pipelines and substations, are potential targets. Additionally, the agricultural and oil/gas industries store combustible and hazardous materials in large volumes in isolated, lightly guarded facilities.

### Critical Facilities

According to FEMA, one consequence of a terrorist or nation-state attack is the degree of debilitating impact that would be caused by the incapacity or destruction of critical infrastructure or a critical function. In rural locations, response to the scene of attack can be delayed, increasing the potential for damage. The closest hospitals in Dickinson and Watford City would likely be overwhelmed by a large-scale attack, necessitating life flights or long ambulance rides to other hospitals.

### Future Conditions

Future development within the study area is not anticipated to impact the probability or extent of an attack.

There is no known direct connection between future climate conditions and the location, extent, intensity, or duration of specific adversarial threats, though indirect connections are possible. For instance, a specific weather episode may help to delay or advance an attack. And Increased heat stress, along with increased summer and winter storms, wildfires, floods, transportation incidents, etc. could increase social unrest, which could encourage increased adversarial threats.

## Summary

**Table 44** summarizes hazard risks and priorities for each County. These previously described hazards have been prioritized based on a combination of historical data, documented impacts, and extensive public and stakeholder feedback. Natural hazards are ranked with higher confidence because long-standing records, mapping, and past events provide a clearer basis for evaluation. In contrast, adversarial or human-caused hazards are more difficult to prioritize due to limited or inconsistent data, which reduces certainty in their relative risk. The resulting priorities reflect both the quantitative information available for natural hazards and the qualitative insights gathered through discussions with local officials, first responders, and other stakeholder groups.

**Table 44. Hazard Ranking Summary**

| Hazard                                | Probability   | Impact      | Regional Risk | Billings Risk | Dunn Risk | Golden Valley Risk | Stark Risk |
|---------------------------------------|---------------|-------------|---------------|---------------|-----------|--------------------|------------|
| Severe Winter Weather                 | Very Likely   | Significant | Very High     | Very High     | Very High | Very High          | Very High  |
| Drought                               | Likely        | Significant | Very High     | Very High     | Very High | Very High          | Very High  |
| Severe Summer Weather                 | Highly Likely | Moderate    | High          | High          | High      | High               | High       |
| Hazardous Material Release            | Very Likely   | Moderate    | High          | Moderate      | High      | Moderate           | High       |
| Wildland Fire                         | Very Likely   | Significant | High          | High          | Moderate  | Moderate           | Low        |
| Urban Fire                            | Very Likely   | Moderate    | Moderate      | Moderate      | Low       | Low                | Moderate   |
| Flood                                 | Likely        | Minor       | Moderate      | Moderate      | Moderate  | Low                | Moderate   |
| Cyber Attack                          | Possible      | Moderate    | Moderate      | Moderate      | Moderate  | Low                | Moderate   |
| Geologic Hazards                      | Possible      | Moderate    | Low           | Moderate      | Moderate  | Low                | Low        |
| Transportation Incident               | Possible      | Low         | Low           | Low           | Moderate  | Low                | Moderate   |
| Infectious Disease & Pest Infestation | Possible      | Moderate    | Low           | Low           | Low       | Low                | Low        |
| Civil Disturbance                     | Possible      | Low         | Low           | Low           | Low       | Low                | Low        |
| Criminal Attack                       | Possible      | Low         | Low           | Low           | Low       | Low                | Low        |
| Terrorist or Nation-State Attack      | Unlikely      | Moderate    | Low           | Low           | Low       | Low                | Low        |
| Space Weather                         | Unlikely      | Minor       | Low           | Low           | Low       | Low                | Low        |

A black and white photograph of a stormy landscape. A large, dark, swirling cloud formation dominates the upper half of the frame, suggesting a severe weather event like a supercell or a developing storm. Below the clouds, a flat, grassy field stretches towards a distant, low hill or ridge. The overall mood is dramatic and ominous.

# **MITIGATION STRATEGIES**

# Introduction

This chapter presents mitigation strategies and action items for each of the four counties and municipalities therein. Actions are designed to reduce the impact of priority hazards discussed in Chapter 3. Each County’s Emergency Manager is the local champion for the MHMP and is responsible for maintaining energy and enthusiasm for their county’s overall mitigation strategy. Emergency Managers must also coordinate with and encourage follow-through from city partners and other responsible parties.

### Implement and Follow-Through

Chapter 4 is where the rubber meets the road. Without ongoing efforts to implement the actions and strategies described in this chapter, the MHMP has limited utility.

# GUIDING GOALS

Billings, Dunn, Golden Valley, and Stark Counties adopt the following goals for the 2025 MHMP. These goals reflect general aspirations for the Plan. While it may be difficult to measure success from year to year, when hazard impacts occur, it is natural to evaluate the general effectiveness of the community’s preparedness and response. Each event is an opportunity to identify what went well, as well as critical gaps and areas for improvement.



- ### Goals\*
- Reduce the impacts of flooding to people and property.
  - Enhance the public’s awareness of hazards.
  - Reduce impacts of severe summer and winter weather to people and property.
  - Reduce impacts of drought and wildland fires to people and property.
  - Reduce impacts of human-caused threats to people and property.
- \*These goals, which were previously listed in the 2020 four-county MHMP, are sustained for the 2025-2030 plan update.*

# Strategy Framework

Implementation actions broadly fall into several categories:

- **Education and Outreach.** Ongoing engagement efforts are essential for increasing local awareness about hazard risks, building community trust, promoting local programs, encouraging desired behavior, and reminding people how to respond when a hazard occurs.
- **Planning and Regulatory.** Hazard mitigation strategies should be integrated into other local and regional planning efforts. For example, city and regional land use plans should consider how development siting impacts the community's exposure to hazards and emergency response capabilities. Likewise, smart transportation planning can reduce the risk of transportation incidents and hazardous materials release. Each jurisdiction regulates development through their zoning code and building code and is responsible for ensuring compliance. Historically, many policies and standards have been adopted to mitigate hazards (e.g., fire protection walls, setbacks, floodplain regulations, and specific standards for industrial uses).
- **Technical and Administrative.** Administrative actions are changes to government operations, policies, or procedures that reduce the impact of hazards. Examples include increased coordination between Emergency Managers and other departments, pursuit/administration of funding awards, or expanded training initiatives.
- **Capital Investments.** Building resilience requires capital investment in transportation facilities, stormwater management, electrical systems, communication systems,

emergency equipment, and other facilities. Capital improvement programs (CIPs) should incorporate priority projects that reduce hazard risk.

Actions need to be practical and achievable for each jurisdiction. Therefore, it is important to assess the existing capabilities and potential gaps for each community with regards to planning and regulation, administration, technical capacity, and funding, etc. Existing capabilities are explored in Chapter 2 (with respect to emergency response programs), Chapter 3 (with respect to specific hazards), and this chapter.

## Capability Assessment

### PLANNING AND REGULATORY CAPACITY

All local jurisdictions can adopt and maintain a comprehensive plan, development regulations, and other policies. However, small jurisdictions have limited capacity to administer and enforce regulations. For example, some cities have adopted the North Dakota State Building Code and require building permits, but do not have a dedicated building inspector.

The North Dakota Legislative Assembly has mandated that the State Building Code consist of the International Building Code (IBC), International Residential Code (IRC), International Mechanical Code (IMC), and International Fuel Gas Code (IFGC). These are nationally recognized codes published by the International Code Council and updated nationally every three years. On Sept. 11, 2025, eligible cities and counties, along with eligible members of the Building Code Advisory Committee, adopted the 2024 updates to the IBC, IRC, IMC, and IFGC and the proposed amendments. The 2024 versions of the International Energy Conservation Code and the International Existing

Building Code and proposed amendments to these codes were also adopted. The new North Dakota State Building Code went into effect Jan. 1, 2026. All of the counties in the four-county study area have adopted the 2024 versions of the previously described codes.

## TECHNICAL AND ADMINISTRATIVE CAPACITY

Another challenge across the region is administrative and technical capacity. Most local governments operate with a small staff, and many personnel carry multiple responsibilities. Stark County and Dunn County have dedicated emergency management departments and full-time emergency managers who support planning, training, and coordination activities. These departments have the authority to improve capabilities but rely on external training opportunities and grant funding to expand technical skills.

Billings County and Golden Valley County do not have dedicated emergency managers. Emergency management duties are typically assigned to a sheriff's office representative or other county staff member as a secondary responsibility. These jurisdictions do not currently have the staffing authority or resources to expand administrative capacity without additional funding support. Volunteer fire departments throughout the region face similar constraints. Departments often struggle to recruit and retain volunteers, which limits the ability to expand operational capabilities or add specialized training.

Several participating jurisdictions have identified steps they could take to improve future capacity. For example, the City of Dodge includes a mitigation action to complete a comprehensive plan. This planning effort would improve administrative capability, strengthen long-term decision making, and establish a more structured foundation for hazard mitigation. Other communities intend to

update ordinances, pursue additional training through state and federal partners, or coordinate more closely with county emergency management where full-time support exists. These actions demonstrate pathways for capacity improvements when resources allow.

## FISCAL CAPACITY

All local jurisdictions can issue bonds and levy taxes. However, most cities and counties in the study area have limited funding resources for implementing comprehensive mitigation actions. All cities and counties except for Dickinson have small population bases and rely on modest tax revenues, which means increasing the public tax burden which is typically undesirable. Dunn County is a partial exception because it receives significant revenue from oil and gas production. This provides opportunities to fund capital projects, equipment needs, or staff support when county leadership prioritizes mitigation. For most communities, fiscal limitations restrict the ability to expand staffing or technical capabilities. Many jurisdictions report that larger mitigation projects require external funding and that local budgets can only support smaller, staff-led actions. To improve fiscal capacity communities are working to identify cost-effective strategies such as multi-jurisdictional training, shared equipment, regional coordination, and low-cost policy updates. Where feasible, jurisdictions will continue to pursue grants that support capability building, although meeting local match requirements will remain a challenge for the smallest communities.

## JURISDICTION-SPECIFIC CAPABILITIES

**Stark County** has a full-time emergency manager who oversees planning, training, coordination, and the pursuit of grant funding which provides a solid foundation for capability improvements. The

county can expand capabilities through additional staff development, technology upgrades, and regional partnerships. However, limited staffing depth restricts the county's ability to support multiple new initiatives at once, and volunteer fire departments continue to face recruitment and retention challenges that limit operational growth.

**Dunn County** maintains a dedicated emergency management department and benefits from revenue generated by oil and gas production, which enables targeted investments in equipment, facilities, and training. These conditions give Dunn County greater flexibility to expand capabilities when prioritized by county leadership. Even so, the county's smaller communities (**Dunn Center, Halliday, and Killdeer**) still struggle with limited staffing and volunteer shortages, and capability expansion is dependent on sustained budget commitments.

**Billings County** does not have a full-time emergency manager, and emergency management responsibilities are assigned as secondary duties to existing staff. This structure limits the county's authority and capacity to expand or improve capabilities without outside support. With a small population and constrained tax base, Billings County is unable to independently fund additional staff or undertake large mitigation projects. Volunteer fire departments also lack the resources to obtain advanced equipment or training without grants.

**Golden Valley County** faces similar challenges, as it also lacks a dedicated emergency management position and operates with staff who manage multiple responsibilities. Fiscal constraints prevent the county from adding personnel or independently funding large-scale mitigation or resilience efforts. Volunteer agencies experience ongoing recruitment and retention issues that further limit operational capability. Improvements are most feasible through

regional partnerships, state-supported training opportunities, and updates to local plans or policies that strengthen administrative capacity at low cost.

The **City of Dickinson** has a larger population and stronger tax base than surrounding jurisdictions, providing greater administrative and fiscal capacity to expand emergency management and mitigation capabilities. Dickinson can enhance capabilities through staff development, ordinance updates, equipment investments, and advanced training opportunities. The city's professional emergency services provide additional capability depth, and Dickinson is well positioned to support regional coordination that benefits smaller neighboring communities. However, major mitigation projects still rely on external grant funding.

Small cities and rural communities throughout the region, including **Belfield, Medora, South Heart, Taylor, Gladstone, Dodge, Richardton, Beach, Golva, and Sentinel Butte** generally operate with very limited staff and do not maintain dedicated emergency management positions. These communities rely heavily on volunteer fire and EMS services, and their ability to expand operational or administrative capabilities is constrained by volunteer availability and limited fiscal resources. Many lack the authority or financial capacity to add staff or undertake complex mitigation projects independently. Capability improvements are most achievable through participation in county-led training and planning efforts, updates to local plans and ordinances, and targeted initiatives such as Dodge's mitigation action to complete a comprehensive plan, which would strengthen long-term administrative and decision-making capacity.

**Table 45** summarizes the planning and administrative capacity, fiscal capacity, and regulatory status for each jurisdiction.

**Table 45. Local Government Capacities**

| Local Jurisdiction          | Zoning Ordinance | Comprehensive Plan | Floodplain Ordinance | Building Code | Building Permits | Fiscal Capacity | Technical / Admin. Capacity |
|-----------------------------|------------------|--------------------|----------------------|---------------|------------------|-----------------|-----------------------------|
| <b>BILLINGS COUNTY</b>      | ✓                | ✓                  |                      | ✓             | ✓                | Low             | Low                         |
| Medora                      | ✓                | ✓                  | ✓                    | ✓             | ✓                | Low             | Low                         |
| <b>DUNN COUNTY</b>          | ✓                | ✓                  | ✓                    | ✓             | ✓                | Moderate        | Moderate                    |
| Dodge                       | ✓                |                    | ✓                    |               | ✓                | Low             | Low                         |
| Dunn Center                 | ✓                | ✓                  | ✓                    |               | ✓                | Low             | Low                         |
| Halliday                    | ✓                |                    | ✓                    |               | ✓                | Low             | Low                         |
| Killdeer                    | ✓                | ✓                  | ✓                    | ✓             | ✓                | Moderate        | Moderate                    |
| <b>GOLDEN VALLEY COUNTY</b> | ✓                | ✓                  | ✓                    | ✓             | ✓                | Low             | Low                         |
| Beach                       | ✓                |                    | ✓                    | ✓             | ✓                | Low             | Low                         |
| Golva                       | ✓                |                    |                      |               | ✓                | Low             | Low                         |
| Sentinel Butte              | ✓                |                    | ✓                    |               | ✓                | Low             | Low                         |
| <b>STARK COUNTY</b>         | ✓                | ✓                  | ✓                    | ✓             | ✓                | Moderate        | Moderate                    |
| Belfield                    |                  |                    | ✓                    |               |                  | Low             | Low                         |
| Dickinson                   | ✓                | ✓                  | ✓                    | ✓             | ✓                | High            | High                        |
| Gladstone                   | ✓                |                    |                      |               |                  | Low             | Low                         |
| Richardton                  |                  |                    |                      | ✓             | ✓                | Low             | Low                         |
| South Heart                 | ✓                |                    | ✓                    | ✓             | ✓                | Low             | Low                         |
| Taylor                      |                  |                    | ✓                    |               | ✓                | Low             | Low                         |

## FUNDING SOURCES

All counties and city governments will need to utilize local, state, and federal funding to implement the action items identified in this plan. Many state and federal funding programs can be utilized, including several that are designed specifically for hazard mitigation. FEMA's Hazard Mitigation Grant Program (HMGP) could provide funding for a wide variety of mitigation projects, and is only available following a North Dakota disaster declaration. An additional FEMA grant program that provide funds for mitigation is the Flood Mitigation Assistance (FMA) program.

Other programs with broad applications that are not specifically designed for hazard mitigation or disaster response should be considered. For example, the U.S. Department of Housing and Urban Development (HUD) Community Development Block Grants (CDBG) and US Department of Agriculture (USDA) Community Facility Grants are available for a wide variety of uses.

**Table 46** summarizes key federal programs.

**Table 46. Federal Funding Opportunities**

| Program (Source)  | Example Use  | Eligibility Requirements  | Local Match       | Max Award / Available Funding  |
|---|--|---|-------------------|--|
| <b>Natural Gas Distribution Infrastructure Safety and Modernization Grant</b> (PHMSA) | Funds projects that repair, rehabilitate, or replace natural gas distribution pipeline systems   | Municipality-owned utilities, community-owned utilities, or Federally recognized tribal governments | No match required | NA / ~\$200 million per year   |
| <b>Pipeline Emergency Response Grant</b> (PHMSA)                                      | Funds training for first responders and others who respond to pipeline incidents in high consequence areas   | State, county, and local governments  | No match required | \$250k / ~\$3 million per year   |
| <b>Hazardous Materials Emergency Preparedness Grant</b> (PHMSA)                       | Funds training and planning programs to increase local effectiveness in safely and efficiently handling hazardous materials in accidents and incidents | States and territories  | No match required | NA / ~\$32 million in FY 2025  |
| <b>Better Utilizing Investments to Leverage Development Grant Program</b> (USDOT)     | Provides grants for surface transportation infrastructure projects with significant local or regional impact   | States, territories, local governments, Federally recognized Tribal Nations, port authorities, MPOs | 20% local match   | \$1.5 billion is available for FY 2026 / Maximum award size of \$25 million, minimum award size of \$1 million for rural areas and \$5 million for urban areas |

| Program (Source)   | Example Use  | Eligibility Requirements  | Local Match  | Max Award / Available Funding           |
|--|--|---|--|---|
| <b>Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (USDOT)*</b><br><small>*This program was paused in 2025 by the Trump Administration but is expected to return under a different name with changed goals / objectives</small> | Provides funding to ensure surface transportation resilience to natural hazards via projects focused on resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. | States, territories, local governments, Federally recognized Tribal Nations, port authorities, MPOs   | 20% local match  | \$876 million was available for FY 2025 |
| <b>Railroad Crossing Elimination Grant Program (FRA)</b>   | Funds projects that improve safety and mobility at rail crossings (installation of signals, grade separation, closure)   | States, territories, local governments, Federally recognized Tribal Nations, port authorities, MPOs   | 20% local match  | \$1.14 billion was available in FY 2024 |
| <b>Environmental Quality Incentives Program (USDA)</b>   | Funds cover crops, regenerative practices, water conservation, drought-resilient grazing systems, and technical assistance   | Farmers, ranchers, and forest landowners who own or rent agricultural land  | Can provide up to 75% of the costs of certain conservation practices | Unknown                                 |
| <b>Regional Conservation Partnership Program (USDA)</b>  | Supports multi-agency partnerships which implement conservation efforts such as land management / land improvement / restoration practices   | States, territories, local governments, Federally recognized Tribal Nations, an institution of higher education, a conservation district, an agricultural or silvicultural producer association | 25% - 50% local match depending on the project                       | \$1.2 billion was available in FY 2024  |

| Program (Source)   | Example Use  | Eligibility Requirements   | Local Match  | Max Award / Available Funding   |
|--|--|--|--|---|
| <b>Community Facilities Direct Loan &amp; Grant Program</b> (USDA) | Funds the development of essential community facilities in rural areas (hospitals, town halls, fire departments, police stations etc.)                               | Public bodies, Federally recognized tribal governments, and community-based nonprofits. Must not have more than 20,000 residents                                   | Match amount is dependent on population                                    | Unknown   |
| <b>Water &amp; Waste Disposal Loan and Grant Program</b> (USDA)    | Funds water distribution line replacements, storage tanks, system capacity improvements  | Most state and local government entities, private nonprofits, federally recognized tribes  | This is a loan with fixed interest rates and up to 40-year payback periods | This is a loan with fixed interest rates and up to 40-year payback periods  |
| <b>Emergency Community Water Assistance Grant</b> (USDA)           | Helps eligible communities prepare, or recover from, an emergency that threatens the availability of safe, reliable drinking water                                   | Rurally located public bodies (population of 10,000 or less), nonprofits, and Federally recognized tribes. Must show major decline in quantity or quality of water | No match required  | Up \$150k for waterline extensions, repair breaks or leaks and up to \$1 million for new wells, transmission lines etc. / Unknown |
| <b>Emergency Management Performance Grant</b> (FEMA)               | Provides the resources required for developing emergency management capabilities and for all-hazards preparedness activities (public alert and warning systems etc.) | States and territories, although units of local government can be a subapplicant/ subrecipient   | No match required  | NA / \$319.5 million for FY 2025  |

| Program (Source)  | Example Use  | Eligibility Requirements   | Local Match   | Max Award / Available Funding  |
|---|--|--|---|--|
| <b>Hazard Mitigation Grant Program</b> (FEMA)           | Funds hazard mitigation plans and projects (retrofitting buildings, implementing drained improvement projects, levees / floodwalls, and upgrading utilities etc.)            | States, territories, and local governments, as well as Federally recognized Tribal Nations. Applicants must have developed and adopted a hazard mitigation plan. Can only be applied for after Presidential Disaster Declaration | 25% local match   | Amount available is calculated as 7.5% of the federal funds spent on Public and Individual Assistance after a declared disaster. |
| <b>Flood Mitigation Assistance Grant Program</b> (FEMA) | Provides funding for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the National Flood Insurance Program                      | States, territories, and local governments, as well as Federally recognized Tribal Nations   | Unknown   | Unknown  |
| <b>Assistance to Firefighters Grants Program</b> (FEMA) | Funds equipment, protective gear, emergency vehicles, training and other resources necessary for protecting the public and emergency personnel from fire and related hazards | Fire departments and nonaffiliated EMS organizations   | 5% local match for jurisdictions with less than 20,000 residents; 10% local match for jurisdictions with more than 20,000 residents; 15% local match for jurisdictions with more than 1,000,000 residents | \$291.6 million was available in FY 2024 with an award ceiling of \$9 million per award  |

| Program (Source)  | Example Use  | Eligibility Requirements   | Local Match   | Max Award / Available Funding  |
|---|--|--|---|--|
| <b>Staffing for Adequate Fire and Emergency Response</b> (FEMA) | Funds the recruitment and retention of volunteer firefighters in rural and high-risk areas   | Fire departments and national, regional, state, local, tribal, and nonprofit interest organizations representing the interests of volunteer fire departments | For hiring activity grants:<br>- 25% of salary in first year<br>- 25% of salary in second year<br>- 65% of salary in third year | \$324 million was available in FY 2024 with an estimate of about \$1 million per award     |
| <b>Small Flood Control Projects – Section 205</b> (USACE)       | Provides funding and technical assistance for construction and feasibility studies of small flood control projects such as levees.   | States, local agencies, or Indian Tribes   | 35% local match of which at least 5% of the total cost must be contributed in cash (50% match for feasibility studies)          | Maximum of \$7 million, including studies, plans, and construction (\$100,000 for studies) |
| <b>Emergency Bank Protection Projects – Section 14</b> (USACE)  | Provides funding for construction of bank protection works to protect endangered highways, bridges, and other essential public works such as municipal water supply systems and sewage disposal plants; churches, hospitals, schools, etc. | States, local agencies, or Indian Tribes   | 35% local match of which at least 5% of the total cost must be contributed in cash  | Maximum of \$1 million per project (\$100,000 for studies)                                 |

| Program (Source)  | Example Use  | Eligibility Requirements   | Local Match   | Max Award / Available Funding   |
|---|--|--|---|---|
| <b>Homeland Security Grant Program</b> (DHS)              | Supports state, local, and tribal governments in developing capabilities to prevent and respond to acts of terrorism (enhancing protection of soft targets, enhancing cybersecurity, etc.) | States and territories although units of local government and counties can be a subapplicant / subrecipient  | No match required   | \$373.5 million for SHSP and \$553.5 million was available for UASI in FY 2025  |
| <b>Cohesive Fire Strategy Grants</b> (USFS)               | Can fund the purchase of supplies, radios, and firefighting tools (allowable through the Wildfire Preparedness opportunity)  | State and local governments, federally recognized tribes, nonprofit corporations, and public- and state-controlled institutions of higher education. | There is a 100% (dollar for dollar) local match requirement for the Wildfire Risk Reduction and Wildfire Preparedness opportunities | \$4.8 million annually (applicants may request between \$25,000 and \$300,000 per application)                                |
| <b>Public Health Emergency Preparedness Program</b> (CDC) | Funds public health emergency planning, disease outbreak response exercises, and health sector coordination  | States, territories, and major cities  | 10% local match   | \$3.26 billion available for the FY 2024-FY 2028 funding cycle / Maximum award of \$50 million and minimum award of \$370,000 |

| Program (Source)   | Example Use   | Eligibility Requirements   | Local Match   | Max Award / Available Funding                                 |
|--|---|--|---|---|
| <b>Grid Resilience and Innovation Partnerships Program</b> (DOE) | Funds grid hardening and modernization projects, undergrounding or partial undergrounding of distribution lines, enhancing resilience to storms and other hazards | States, units of local government, Indian Tribes, a public utility commission, electric grid operators, etc. | 50% local match for Smart Grid Grants and Grid Innovation Program; 100% local match for Grid Resilience Grants    | \$3.9 billion was available for FY 2024-FY 2025 funding cycle |
| <b>State and Tribal Indoor Radon Grant</b> (EPA)                 | Funds projects which raise radon awareness, promotes adoption of radon-resistant building techniques, and encourages radon testing and mitigation.                | States, units of local government, Tribal governments, institutes of higher education                        | For stand-alone state and Tribal grants:<br>- 25% for first year<br>- 40% for second year<br>- 50% for third year | Unknown   |

## Mitigation Actions

This section identifies mitigation actions for each jurisdiction that participated in the Multi-Hazard Mitigation Plan. These mitigation actions were developed through discussion with local officials and other stakeholders. The process for updating the actions for the 2025 MHMP consisted of:

- **Workshop Series 1 (April 2025).** Discussion and identification of preliminary actions and potential strategies with project stakeholders. At this time, potential action items were discussed without reference to the previous MHMP, which encouraged workshop participants to think critically and creatively.
- **Community Survey (April-June 2025).** Collection and incorporation of public feedback and suggestions received from the survey.
- **Dickinson Focus Group (June 4, 2025).** Discussion of actions and strategies for Dickinson and status update for previous MHMP.
- **Workshop Series 2 (August 2025).** Review of action items from the previous plan; development and prioritization of implementation tables.
- **Plan Review Process (September-November 2025).** Incorporation of feedback and revisions from jurisdictional partners, the North Dakota Department of Emergency Services, and FEMA.

A broad range of potential mitigation activities were considered. Actions are prioritized based on what will have the greatest benefit and/or lowest cost for implementation. Several preparedness and

response actions discussed during the planning process are also included in the plan. Prioritization levels are identified in terms of low, moderate, or high, with prioritization defined as follows:

- Low – actions offer smaller or more indirect risk reduction benefits, may address lower-probability hazards, or require substantial funding or long-term coordination before implementation becomes feasible.
- Moderate – actions provide meaningful risk reduction but may require additional planning, coordination, or funding before implementation.
- High – actions are those that provide significant risk reduction benefits, address hazards with the greatest potential impacts, protect critical facilities or vulnerable populations, and are considered highly feasible for implementation in the near future with available resources.

This section provides a roadmap for targeting and implementing mitigation projects over the next five years. Project costs are identified in terms of staff time, low, moderate or high cost, with costs defined as follows:

- Low – projects estimated to cost up to \$1,000
- Moderate – projects estimated to cost up to \$10,000
- High – projects estimated to cost more than \$10,000
- Staff time – variable cost/incorporated into existing budgets

Many projects are eligible for grants or other outside funding. The implementation timeline for each project may be highly variable based on the availability of funds. The previous section describes potential funding sources.

# BILLINGS COUNTY ACTION PLAN

The previous Multi-Hazard Mitigation Plan contained 42 mitigation actions for Billings County and Medora, including 27 unique actions. (Many actions were applicable to both jurisdictions). Several actions have been completed or remain ongoing. The 2025 MHMP builds on previous planning efforts by removing actions that have been completed or that communities deem to be no longer relevant, and by incorporating new or modified actions, as desired by the communities. **Appendix D** provides a status update for actions that were removed, retained, or completed.

**Table 47** presents the updated lists of mitigation actions for Billings County and Medora. Actions identified for “all jurisdictions” apply to all cities and the county. Responsibility for implementation ultimately rests with each jurisdiction. The individual or agency responsible for overseeing implementation of mitigation projects for each jurisdiction is listed in the table. The actual person(s) performing the project may be different than the responsible party. Additional notes are included following the table.

Many actions are retained from the 2020 MHMP, although additional details have been added to clarify the action and the reasons for inclusion. Several actions are wholly new, as indicated in the table. These actions reflect changing conditions and priorities. Throughout the table, high-priority items are highlighted in red.

**Table 47. Billings County Mitigation Actions**

| ID                     | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism  | Lead Party                        | Time Frame |
|------------------------|---|---|----------|------------|--|-----------------------------------|------------|
| <b>BILLINGS COUNTY</b> |   |   |          |            |  |                                   |            |
| A                      | <b>The county will maintain a communication system for all elements of the emergency response team and update it as needed to ensure compatibility with state systems and mutual aid partners.</b> Regular assessments and upgrades will address technological gaps, improve interoperability, and ensure reliable information sharing during emergencies. By strengthening communications, the county will enhance coordination and reduces response times to critical events.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | Low        | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)  | Billings County Emergency Manager | 2030       |
| B                      | <b>The county will ensure it has a reliable mass notification system capable of reaching all cell phones within the jurisdiction.</b> The system will include the development of pre-approved messaging templates for various hazard scenarios to ensure timely and clear communication. This action will enhance public awareness, enable faster protective actions, and increase overall community resilience during emergencies.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure  | Moderate | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)   | Billings County Emergency Manager | 2030       |
| C                      | <b>The county will conduct annual joint training exercises, including tabletop and scenario-based drills, to practice coordinated responses for priority hazards.</b> These exercises will involve emergency responders, public agencies, and community partners to improve decision-making and refine operational plans. Regular joint training will strengthen preparedness and enhance interagency coordination, resulting in long-term community resilience to a variety of hazards.  | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | Staff time | Billings County General Budget<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Hazard Mitigation Grant Program (FEMA)<br>Hazardous Materials Emergency Preparedness Grant (PHMSA) | Billings County Emergency Manager | Annually   |
| D                      | <b>The county will conduct ongoing public outreach and education to increase awareness of local hazard risks and community mitigation and response efforts, with targeted messaging for residents and tourists.</b> Outreach may include signage at key destinations, informational materials at lodging facilities, and updates shared through county websites and social media platforms. As part of this effort, the county will incorporate dam failure-specific information into outreach materials. This will include maps of Medora Levee inundation areas and an explanation of local warning and alert systems as well as evacuation routes. | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, geological hazards, infectious disease & pest infestation               | High     | Staff time | Billings County General Budget<br>Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA)  | Billings County Emergency Manager | 2030       |
| E<br>(new)             | <b>The county will design and construct a secondary access route to the Chateau, Musical, and Presidential Library to maintain mobility when train crossings block the primary roadway.</b> Establishing an alternate access point will ensure that visitors, staff, and emergency responders can reach these facilities without delay during rail-related disruptions. This improvement will enhance safety and reduce congestion in the event of a transportation incident or evacuation.   | Transportation incident   | High     | High       | Better Utilizing Investments to Leverage Development Grant Program (USDOT)<br>Hazard Mitigation Grant Program (FEMA)   | Billings County Road Department   | 2028       |

| ID  | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism   | Lead Party   | Time Frame |
|---|---|---|----------|------------|---|--|------------|
| F   | <b>The county will encourage the use of snow fences and shelterbelts in areas prone to drifting and reduced visibility.</b> These measures will help keep roads clear, improve travel safety, and reduce maintenance demands during major winter storms. By expanding the use of snow-control practices, the county will be able to strengthen overall community resilience and minimize disruptions caused by severe winter conditions.  | Severe winter weather   | Low      | Staff Time | Billings County General Budget<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (USDOT)          | Billings County Road Department                              | 2030       |
| <b>MEDORA</b>   |   |   |          |            |   |  |            |
| G   | <b>The city will maintain the Medora levee and seek opportunities to replace it with a certified dike that meets current engineering and FEMA standards.</b> A certified structure will provide more reliable flood protection, reduce insurance burdens, and improve long-term safety for residents and businesses. Strengthening this critical infrastructure enhances the city's resilience to future high-water events.   | Flooding, dam failure   | High     | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Small Flood Control Projects – Section 205 (USACE)<br>Emergency Bank Protection Projects – Section 14 (USACE) | City of Medora City Council                                  | 2030       |
| H   | <b>The city will acquire backup generators for critical facilities in Medora using a prioritized approach based on facility function, vulnerability, and community need.</b> Identifying and ranking essential sites such as emergency services, water systems, and public shelters will guide phased generator procurement. By ensuring reliable backup power the city will be able to enhance continuity of operations and strengthen community resilience during emergencies.  | Severe summer weather, severe winter weather, flood, urban fire, wildland fire, hazardous materials release, transportation incident, civil disturbance | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA)      | City of Medora City Council*, Critical facility owners       | 2030       |
| I<br>(new)  | <b>The city will continue upgrading water pipelines and expanding water storage capacity to ensure adequate flow and pressure for firefighting.</b> Improving system reliability will reduce the risk of water shortages during fire response and enhance protection for homes, businesses, and critical facilities. Strengthening water infrastructure increases the city's long-term resilience to urban fire events.   | Urban fire  | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Water & Waste Disposal Loan & Grant Program (USDA)<br>Community Facilities Direct Loan & Grant Program (USDA) | City of Medora City Council                                  | 2030       |
| <b>ALL JURISDICTIONS (BILLINGS COUNTY AND MEDORA)</b> |   |   |          |            |   |  |            |
| J<br>(new)  | <b>The county and city will evaluate the need for outdoor warning sirens in Medora and install new or upgrade existing systems in large outdoor gathering areas as appropriate.</b> This effort will include expanding siren capabilities to incorporate distinct flash flood and dam failure warning tones so the public can clearly differentiate these hazards from other emergency alerts. The evaluation will review Medora Levee inundation mapping, identify populations located downstream of dam/levee structures, and assess coverage gaps in high-traffic areas, campgrounds, recreational sites, and tourism destinations. Siren placement and upgrades will be prioritized to ensure that residents and visitors within potential flash flood and dam/levee failure impact areas receive timely, hazard-specific alerts. Enhancing the siren system strengthens public warning capabilities and improves overall community preparedness. | Severe summer weather, hazardous materials release, wildland fire, flood, dam failure   | Moderate | High       | Hazard Mitigation Grant Program (FEMA)  | Billings County Emergency Manager*, Medora City Engineer     | 2026       |
| K<br>(new)  | <b>The county and the city will continue preparation, coordination, and contingency planning for the Theodore Roosevelt Presidential Library grand opening.</b> This includes developing weather response protocols, managing traffic flow, and coordinating with emergency services to ensure safe operations during large visitor influxes. Proactive planning will reduce the risk of disruption and strengthen the city's ability to manage major events under a range of hazard conditions.  | Severe summer weather, transportation incident  | High     | Staff Time | Billings County General Budget<br>City of Medora General Budget   | Billings County Emergency Manager*, Medora Police Department | 2026       |

| ID         | Action   | Hazard(s)  | Priority | Cost       | Funding Mechanism  | Lead Party  | Time Frame |
|------------|--|--|----------|------------|--|---|------------|
| L          | <b>The county and the city will review existing emergency sheltering options and establish additional shelters where needed to ensure adequate capacity during extreme heat, storms, or other summer hazards.</b> This will include identifying accessible locations, ensuring necessary supplies, and coordinating staffing and communications. By expanding sheltering capacity the county and the city will be able to enhance community safety and reduce vulnerability during severe summer weather events.   | Severe summer weather                            | High     | Med        | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA)   | Billings County Emergency Manager*,<br>City of Medora City Council, Medora Convention & Visitors Bureau | 2027       |
| M<br>(new) | <b>The county and the city will identify locations to serve as community shelters or warming centers equipped with operable generators and sufficient emergency food and water supplies.</b> Plans for transporting residents will also be made if needed. Ensuring these facilities are fully functional during extreme cold or winter storms provides safe refuge for vulnerable populations. Establishing and maintaining these shelters strengthens community resilience and reduces risks to public health and safety during severe winter events.                    | Severe winter weather                            | Moderate | Staff time | Billings County General Budget<br>City of Medora General Budget<br>Hazard Mitigation Grant Program (FEMA)<br>Water & Waste Disposal Loan & Grant Program (USDA)<br>Community Facilities Direct Loan & Grant Program (USDA) | Billings County Emergency Manager*,<br>City of Medora City Council, Medora Convention & Visitors Bureau | 2026       |
| N          | <b>The county and the city will continue to administer and enforce burn restriction policies, especially during periods of elevated fire risk.</b> Regular enforcement, public outreach, and clear communication of restrictions will assist in the prevention of accidental ignitions and reduce the likelihood of uncontrolled fires. Maintaining this policy strengthens community safety and enhances long-term resilience to wildfire and urban fire events.  | Wildland/urban fire                              | Moderate | Staff time | Billings County General Budget<br>City of Medora General Budget  | Medora City Council,<br>Billings County Commission*   | Annually   |
| O          | <b>The county and city will maintain and systematically upgrade firefighting, wildland suppression, and hazmat response equipment.</b> Regular assessments will guide replacement of outdated PPE, SCBAs, communications gear, and suppression tools, while prioritizing purchases for high-risk areas. These ongoing upgrades will reduce vulnerability by ensuring firefighter safety and strengthening the county's ability to contain fires or hazardous releases before they escalate.  | Wildland/urban fire, hazardous materials release | High     | High       | Cohesive Fire Strategy Grants (USFS)   | Medora Volunteer Fire Department, Billings County Emergency Manager*                                    | Annually   |
| P          | <b>The county and city will annually review and revise staffing, training, and equipment plans for fire and ambulance services.</b> This review will identify gaps in response capability, guide targeted training, and prioritize recruitment and certification of additional First Responders, especially in high-risk or rural areas with longer response times. Strengthening personnel capacity and modernizing equipment will improve the county's ability to contain fires, respond to crashes, and prevent small incidents from escalating into major emergencies. | Wildland/urban fire, transportation incident     | High     | High       | Assistance to Firefighters Grant (FEMA)<br>Staffing for Adequate Fire and Emergency Response (FEMA)<br>Emergency Management Performance Grant (FEMA)   | Medora Volunteer Fire Department, Billings County Emergency Manager*                                    | Annually   |
| Q          | <b>The county and city will follow Firewise program principles and promote best practices during wildfire season.</b> This includes encouraging residents to maintain defensible space, reduce vegetation hazards, and use fire-resistant materials around homes located in or near areas of concern. Implementing these practices will lower ignition potential and strengthen community-wide resilience to future wildfire events.   | Wildland/urban fire                              | Moderate | Staff time | Billings County General Budget<br>City of Medora General Budget  | Medora City Council,<br>Billings County Commission*   | 2030       |

| ID | Action  | Hazard(s)  | Priority | Cost       | Funding Mechanism  | Lead Party   | Time Frame |
|----|---|--|----------|------------|--|--|------------|
| R  | <b>The county and city will install and maintain surge protection on critical equipment to prevent damage from lightning and power fluctuations.</b> Prioritized facilities may include emergency operations centers, communications systems, and essential public safety infrastructure. Maintaining surge protection will reduce equipment failure and minimize service disruptions, strengthening the county's ability to remain operational during severe storms.   | Severe summer weather                            | Low      | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA)  | Critical facility owners, Billings County Emergency Manager*, Medora City Engineer | 2030       |
| S  | <b>The county and city will encourage utility providers to bury electric power lines in areas most vulnerable to outages from high winds, ice, and heavy snow.</b> Undergrounding lines will reduce the likelihood of weather-related damage and shorten restoration times after major storms. This effort will strengthen the reliability of critical utilities and improve community resilience during extreme weather events.  | Severe summer and winter weather                 | Low      | High       | Hazard Mitigation Grant Program (FEMA)<br>Grid Resilience and Innovation Partnerships Program (DOE)  | Medora City Council, Billings County Emergency Manager*, critical facility owners  | 2030       |
| T  | <b>The county and city will complete physical improvements to culverts, roads, and bridges to reduce washouts, protect adjacent properties, and maintain access during high-water events.</b> Ongoing bridge and culvert inspections will identify structural deficiencies and prioritize upgrades in areas with recurring flooding or inadequate drainage capacity. These improvements will strengthen infrastructure resilience and reduce future flood-related damages and disruptions.<br><br>Medora will coordinate with NDDOT to replace culverts along the I-94 eastern city entrance to improve drainage capacity and reduce roadway overtopping. Replacing undersized or aging culverts will help manage stormwater more effectively and mitigate recurring flood impacts in this area. These improvements will enhance infrastructure resilience and maintain safe access during high-water events. | Flooding   | High     | High       | Billings County General Budget<br>North Dakota Funding and Grants programs (various)<br>Hazard Mitigation Grant Program (FEMA)<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development Grant Program (USDOT) | Billings County Road Department, Medora City Engineer*                             | 2030       |
| U  | <b>The county and city will continue participating in the National Flood Insurance Program to maintain access to flood insurance and federal mitigation resources.</b> Ongoing participation will encourage responsible development practices in flood-prone areas and improve public awareness of flood risks. This commitment will strengthen community resilience by reducing future flood losses and supporting informed decision-making.   | Flooding   | Moderate | Staff time | Billings County General Budget<br>City of Medora General Budget  | Billings County Floodplain Manager*, Medora City Engineer                          | 2030       |
| V  | <b>The county and city will conduct NFIP workshops to educate the public on the benefits of flood insurance and how to assess individual property risk.</b> Workshops will provide guidance on policy options, mitigation strategies, and steps homeowners can take to reduce flood damage, such as elevating structures or improving drainage. Educating the community will increase awareness and encourage proactive risk reduction.   | Flooding   | Moderate | Staff time | Billings County General Budget<br>City of Medora General Budget  | Billings County Emergency Manager*, Medora City Auditor                            | 2030       |
| W  | <b>The county and city will support Billings County NDSU Extension in the collection of condition monitoring observer reports (CMORE) reports that monitor drought conditions throughout the state.</b> This data collection provides the public, government, and non-governmental insights into drought conditions to take actions based on drought conditions. NDSU Extension also provides agricultural producers information on long-term resiliency building strategies such as regenerative agriculture, the importance of crop rotation, and cover crops which are all methods to reduce drought impact and build long-term resiliency to drought.   | Drought, infectious disease and pest infestation | Moderate | Staff time | Billings County General Budget<br>City of Medora General Budget<br>Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)   | Medora City Council, Billings County Commission*                                   | 2030       |

| ID          | Action   | Hazard(s)  | Priority | Cost       | Funding Mechanism   | Lead Party  | Time Frame |
|-------------|--|--|----------|------------|---|---|------------|
| X           | <b>The county and city will coordinate with Southwest Health to maintain up-to-date emergency operational plans and conduct annual training exercises.</b> These efforts will ensure that staff are familiar with procedures and can efficiently respond to incidents. Ongoing coordination and training will improve overall preparedness, reduce response times, and strengthen community resilience to a wide range of hazards.   | Infectious disease, hazardous material release       | High     | Staff time | Billings County General Budget<br>City of Medora General Budget,<br>Public Health Emergency Preparedness Program (CDC)<br>Emergency Management Performance Grant (FEMA) | Billings County Emergency Manager*,<br>Medora City Auditor  | 2030       |
| Y<br>(new)  | <b>The county and city will continue to encourage railroad crossing safety projects and maintain ongoing communication with BNSF.</b> This includes identifying high-risk crossings, implementing warning systems or safety improvements, and sharing information on hazardous materials transport with first responders and the public. These efforts will reduce the likelihood of accidents and improve emergency response coordination.  | Transportation incident, hazardous materials release | Moderate | Staff time | Billings County General Budget, City of Medora General Budget<br>Railroad Crossing Elimination Grant Program (FRA)  | Medora City Council,<br>Billings County Commission*         | 2030       |
| AZ          | <b>The county and city will develop backup systems and implement enhanced cybersecurity measures to protect critical data and infrastructure.</b> This includes routine data backups, network monitoring, employee training, and protocols to quickly recover systems in the event of a breach. This action will strengthen cyber defenses and reduce the likelihood of operational disruptions while also enhancing the community's resilience against evolving digital threats.  | Cyber-attack   | Moderate | Low        | Homeland Security Grant Program (DHS)   | Medora City Auditor,<br>Billings County Administrator*      | 2030       |
| AA<br>(new) | <b>All jurisdictions will provide annual public education relating to radon risk and encourage households and business to perform radon testing and mitigation.</b> Outreach may include signage at key destinations, materials at community centers and/or city halls, and information shared through county and city websites and social media. Increasing awareness among residents will strengthen overall preparedness.   | Geologic hazard                                      | Moderate | Staff time | Billings County General Budget<br>State and Tribal Indoor Radon Grant (EPA)   | Billings County Emergency Manager*,<br>Medora City Engineer | Annually   |
| BB<br>(new) | <b>All jurisdictions will collaborate with one another to develop and implement a comprehensive drought resilience and water conservation program.</b> This will include identifying vulnerable water supply systems, promoting water conservation practices, encouraging drought-resilient agricultural techniques, and supporting the development of local drought contingency plans. The jurisdictions will strive to expand education and outreach efforts to inform residents and farmers / ranchers about drought risks and water conservation strategies. | Drought  | Moderate | Moderate   | Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)<br>General Budgets of each Jurisdiction                             | Billings County Emergency Manager*,<br>Medora City Auditor  | Annually   |

\*Lead for Mitigation Action

## Additional Notes for Billings County Mitigation Actions

### Internal Communication System (A)

Interagency communication is essential during a hazardous event. Billings County will continue to update and enhance communication systems as technology improves.

### Emergency Alert Systems (B)

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

### Emergency Training Exercises (C)

Table top training has been demonstrated to be an effective low-cost way to train for many emergency events. Billings County currently conducts two trainings a year, including wildfire response training with the National Forest Service.

### Public Outreach and Education (D)

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

- Severe summer weather and severe winter safety/shelter in place
- Trail safety
- Fire weather notifications and fire prevention best practices
- Infectious disease and pest control
- ND Vision Zero programs
- Travel emergency preparedness
- Flood mitigation/NFIP

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

### Chateau Access (E)

A secondary access to the blufftop is necessary to support emergency access and evacuations in the event of a fire or transportation incident, in addition to reducing congestion as traffic volumes increase. In the short term (2026), TRMF is working with the U.S. Forest Service to upgrade the existing trail into a minimum maintenance road that can be used by emergency vehicles. In the long term, a permanent road should be designed and constructed to local standards.

### Snow Fences and Shelterbelts (F)

As an ongoing policy, the Billings County Road Department encourages properly placed snow fences and shelterbelts to substantially reduce the location and frequency of snow blocked roads.

### Medora Levee (G)

The Little Missouri River runs along the western edge of Medora. An uncertified levee prevents high river waters from flooding much of the city. Levee failure could result in damage to a large part of the city.

### Backup Generators (H)

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

## Water Supply Improvements (I)

It is essential to ensure adequate water supply and fire flows throughout the community. Most of the existing water pipes north of Pacific Avenue are at least 60 years old and include asbestos cement. Recently, the City utilized a development agreement with TRMF to upgrade the existing water tank in town to 50,000-gallon capacity and construct a new 50,000-gallon tank west of the Little Missouri River. A water tank is also being installed for the new event barn south of town.

## Warning Sirens (J)

Medora and Billings County will assess the need for outdoor warning sirens, and work with Billings County Emergency Management to acquire and install siren system.

## Presidential Library Preparations (K)

The Presidential Library will draw thousands of visitors when it opens in July 2026, with elevated levels of tourism expected throughout the year. EMS is coordinating with state agencies and surrounding counties to increase staffing for the grand opening. The biggest concerns are excessive heat and unprepared tourists, both in town and on the trails. There will also be an increased risk of transportation incidents, with up to 200 buses operating to transport visitors to the library from parking areas in the county.

## Storm Shelters (L)

High winds, hailstorms and tornadoes are a threat to public safety, especially for individuals who lack secure shelter or who become stranded outdoors. Campgrounds and outdoor large outdoor gathering sites are especially at risk. Grant money is available to pay for the majority of the cost of installing a storm shelter. Existing community facilities with basements or reinforced construction may also be used as storm shelters.

## Winter Shelters (M)

Most North Dakota residents are prepared for severe winter weather – a common occurrence – and have the mentality to ride out the storm on their own. However, some people may need assistance, and in the event of a large-scale power outage, there should be a plan to utilize a community sheltering location such as a school or the Medora Community Center for a day or more.

## Burn Restriction (N)

Wildland fires and urban fires can be minimized by limiting open burning during seasons of high outdoor fire risk. Establishing and enforcing a burn ban can be an effective tool to reduce risk to life and property. Billings County's burn restriction policy is an effective tool to reduce risk to life and property. All local jurisdictions are responsible for enforcing the policy and educating the public about the purpose of the regulations.

## Wildfire Response (O)

Wildland fires are a frequent event and major threat in Billings County. The historical wildland fire frequency and difficult terrain both highlight the need for upgraded firefighting capacity. Hazardous materials releases from oil and gas facilities pose a significant risk for the County as well.

## First Responder Staffing and Training (P)

Emergency services are becoming harder to staff with volunteers as long-time volunteers grow older and work/life conflicts reduce the available supply of new volunteers. Volunteers have limited availability during tourist season, when they are needed most. Recently, TRMF has encouraged their full-time staff to support

volunteer efforts. Maintaining this effort and developing partnerships for mutual aid are critical.

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

### **Firewise (Q)**

Firewise is a nationwide program produced by the National Fire Protection Association. Within North Dakota the program is operated by the state Forest Service. Firewise focuses on education for individual homeowners to help prepare homes for wildfire resistance. Each jurisdiction's role within this program is to educate residents about wildfire risks and mitigation activities they can do to reduce their individual risk. In addition to public education, the county and each city should evaluate opportunities for fuel reduction activities during wildfire season. Additional resources may be required to implement fuel reduction activities. Wildfire fuels reduction is eligible for funding through the FEMA HMGP and PDM grant programs.

### **Surge Protection (R)**

Lightning strikes and space weather can cause significant damage to essential equipment. Surge protection is beneficial for any facility where a loss of power or equipment failure would hinder critical functions or public safety. This could apply to healthcare facilities, emergency services, water and waste treatment plants, industrial facilities, government buildings, and other uses. The Billings County Courthouse was recently improved.

### **Electric Lines (S)**

Power outages may cause some critical facilities and some residences to be without heat or electricity for essential functions for extended time periods. Burying power lines is a practical way to reduce the risk of power failure. However, burying underground lines is more expensive than constructing overhead lines and may not be a high priority for utilities, especially when repairing/replacing overhead lines. Undergrounding power lines is best achieved at the time of development and should be encouraged as development occurs.

### **Road and Bridge Improvements (T)**

City and County officials have identified many locations where roads are at risk from flooding that disrupts transportation and could cause property damage. Potential improvements include replacing aging and undersized culverts, elevating commonly flood impacted roads and bridges, and making other physical improvements to minimize flooding impacts on the road network and nearby property. Medora's east side is subject to localized flooding in part because of sediment washing into the drainage systems along Business 94. The city is currently working with NDDOT on a box culvert improvement.

### **NFIP Participation (U)**

Billings County has a floodplain manager and is a participant in the NFIP. There is no flood hazard map for the County, but the recently completed Risk MAP program for every county in North Dakota has provided additional information to help identify unmapped areas which may be at risk from flooding. Medora also has a floodplain manager and participates in the NFIP, but has an established FIRM.

## **NFIP Workshop (V)**

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

## **Support NSDU Extension (W)**

Agriculture is a key component of the county's economy. Significant droughts, pest infestations, winter storms, summer storms, and flooding all affect the industry and the economy of the entire county. Billings County provides annual funding assistance to help farmers and ranchers respond to drought and other hazards.

## **SW Health Coordination (X)**

Southwest District Health has detailed emergency operational plans for health hazards including the outbreak of infectious disease. It is essential that each local governing body and relevant organizations coordinate in keeping these plans up to date and training for a potential health risk.

## **Railroad Crossing Safety (Y).**

There are two at-grade railroad crossings in Medora, with a risk of transportation incident involving a train and passenger vehicles, buses, or pedestrians. BNSF is currently working to complete crossing improvements on Chateau Road.

## **Cybersecurity (Z)**

Cyber-attacks can cause costly impacts for local governments, schools, and other critical facilities. Strategies and solutions include

multifactor authentication, security awareness training (e.g., fake phishing emails), and migrating to cloud-based storage. Agencies and organizations can also conduct simulated cyber-attacks to test the effectiveness of their cyber security system.

## **Radon Mitigation (AA)**

Radon is a widespread hazard in North Dakota and can cause long-term health impacts, including lung cancer. The entire state is within the EPA's Zone 1, meaning there is a high probability of radon being found in the soil. There are several mitigation strategies for radon exposure in households. Prior to mitigation, however, the lower levels of structures must be tested with simple Radon Test kits that can be acquired at local hardware stores or a variety of suppliers.

## **Drought Resilience and Water Conservation Program (BB)**

Drought poses a significant threat to rural jurisdictions due to their heavy reliance on agriculture and limited water supply infrastructure. Prolonged periods of below-average precipitation can reduce soil moisture, leading to crop losses, reduced livestock productivity, and financial hardship for agricultural producers, which in turn affects the broader local economy. Strengthening regional coordination and promoting proactive drought planning will reduce the severity of economic, environmental, and public health impacts associated with drought, particularly in communities currently lacking drought-specific mitigation actions.

# DUNN COUNTY ACTION PLAN

The previous Multi-Hazard Mitigation Plan contained 80 mitigation actions for all local governments in Dunn County, including 36 unique actions. (Many actions are applicable to multiple jurisdictions.) Several actions have been completed or remain ongoing. The 2025 MHMP builds on previous planning efforts by removing actions that have been completed or that communities deem to be no longer relevant, and by incorporating new or modified actions, as desired by the communities. **Appendix D** provides a status update for actions that were removed, retained, or completed.

**Table 48** presents the updated mitigation actions for Dunn County and the Cities of Dodge, Dunn Center, Halliday, and Killdeer. Actions identified for “all jurisdictions” apply to all cities and the county. Responsibility for implementation ultimately rests with each jurisdiction. The individual or agency responsible for overseeing implementation of mitigation projects for each jurisdiction is listed in the table. The actual person(s) performing the project may be different than the responsible party. Additional notes are included following the table.

Many actions are retained from the 2020 MHMP, although additional details have been added to clarify the action and the reasons for inclusion. Several actions are wholly new, as indicated in the table. These actions reflect changing conditions and priorities. Throughout the table, high-priority items are highlighted in red.

**Table 48. Dunn County Mitigation Actions**

| ID                 | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism  | Lead Party                    | Time Frame |
|--------------------|---|---|----------|------------|--|-------------------------------|------------|
| <b>DUNN COUNTY</b> |   |   |          |            |  |                               |            |
| A                  | <b>The county will maintain a communication system for all elements of the emergency response team and update it as needed to ensure compatibility with state systems and mutual aid partners.</b> Regular assessments and upgrades will address technological gaps, improve interoperability, and ensure reliable information sharing during emergencies. By strengthening communications, the county will enhance coordination and reduces response times to critical events.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | Low        | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)  | Dunn County Emergency Manager | Annually   |
| B                  | <b>The county will ensure it has a reliable mass notification system capable of reaching all cell phones within the jurisdiction.</b> The system will include the development of pre-approved messaging templates for various hazard scenarios to ensure timely and clear communication. This action will enhance public awareness, enable faster protective actions, and increase overall community resilience during emergencies.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure  | Med      | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)   | Dunn County Emergency Manager | 2030       |
| C                  | <b>The county will conduct annual joint training exercises, including tabletop and scenario-based drills, to practice coordinated responses for priority hazards.</b> These exercises will involve emergency responders, public agencies, and community partners to improve decision-making and refine operational plans. Regular joint training will strengthen preparedness and enhance interagency coordination, resulting in long-term community resilience to a variety of hazards.  | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | Staff time | Dunn County General Budget<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Hazard Mitigation Grant Program (FEMA)<br>Hazardous Materials Emergency Preparedness Grant (PHMSA) | Dunn County Emergency Manager | Annually   |
| D                  | <b>The county will conduct ongoing public outreach and education to increase awareness of local hazard risks and community mitigation and response efforts, with targeted messaging for residents and visitors.</b> Outreach may include signage at key destinations, informational materials at lodging facilities, and updates shared through county websites and social media platforms. As part of this effort, the county will incorporate dam failure-specific information into outreach materials. This will include maps of Lake Ilo Dam and Gustafson Dam inundation areas and an explanation of local warning and alert systems as well as evacuation routes. | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, geological hazards, infectious disease & pest infestation               | High     | Staff time | Dunn County General Budget<br>Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA)  | Dunn County Emergency Manager | 2030       |
| E                  | <b>The county will annually review and revise staffing and training plans for fire and ambulance personnel.</b> This process will identify gaps, guide targeted training, and prioritize recruitment and certification of additional First Responders, particularly in areas with longer response times or higher hazard exposure. By strengthening personnel capacity, the county will ensure a more effective emergency response to a variety of hazards.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | High       | Assistance to Firefighters Grant (FEMA)<br>Staffing for Adequate Fire and Emergency Response (FEMA)<br>Emergency Management Performance Grant (FEMA)   | Dunn County Emergency Manager | Annually   |

| ID                              | Action   | Hazard(s)   | Priority | Cost       | Funding Mechanism  | Lead Party   | Time Frame |
|---------------------------------|--|---|----------|------------|--|--|------------|
| F                               | <b>The county will review the need for outdoor warning sirens and install or upgrade them in large outdoor gathering areas as appropriate.</b> This effort will include expanding siren capabilities to incorporate distinct flash flood and dam failure warning tones so the public can clearly differentiate these hazards from other emergency alerts. The evaluation will review Lake Llo Dam and Gustafson Dam inundation mapping, identify populations located downstream of dam/levee structures, and assess coverage gaps in high-traffic areas, campgrounds, recreational sites, and tourism destinations. Siren placement and upgrades will be prioritized to ensure that residents and visitors within potential flash flood and dam/levee failure impact areas receive timely, hazard-specific alerts. Enhancing the siren system strengthens public warning capabilities and improves overall community preparedness. | Severe summer weather, hazardous materials release, wildland fire, flood, dam failure | High     | High       | Hazard Mitigation Grant Program (FEMA)   | Dunn County Emergency Manager  | 2026       |
| G                               | <b>The county will encourage the use of snow fences and shelterbelts in areas prone to drifting and reduced visibility.</b> These measures will help keep roads clear, improve travel safety, and reduce maintenance demands during major winter storms. By expanding the use of snow-control practices, the county will be able strengthen overall community resilience and minimize disruptions caused by severe winter conditions.  | Severe winter weather   | Low      | Staff time | Dunn County General Budget<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (USDOT)         | Dunn County Road Department  | 2030       |
| H                               | <b>The county will conduct an NFIP workshop to educate the public on the benefits of flood insurance and how to assess individual property risk.</b> This workshop will provide guidance on policy options, mitigation strategies, and steps homeowners can take to reduce flood damage, such as elevating structures or improving drainage. Educating the community will increase awareness and encourage proactive risk reduction.   | Flooding  | Low      | Staff time | Hazard Mitigation Grant Program (FEMA)<br>Dunn County General Budget   | Dunn County Floodplain Administrator (P&Z Administrator), Dunn County Emergency Manager* | 2026       |
| I                               | <b>The county will coordinate with Southwest Health to maintain up-to-date emergency operational plans for infectious disease outbreaks and other critical incidents as well as conduct annual training exercises.</b> These efforts will ensure that staff are familiar with procedures and can efficiently respond to incidents. Ongoing coordination and training will improve overall preparedness, reduce response times, and strengthen community resilience to a wide range of hazards.   | Infectious disease, hazardous materials release, transportation incident              | High     | Staff time | Dunn County General Budget, Public Health Emergency Preparedness Program (CDC)<br>Emergency Management Performance Grant (FEMA)                    | Dunn County Emergency Manager  | 2030       |
| <b>DUNN COUNTY AND KILLDEER</b> |  |   |          |            |  |  |            |
| J                               | <b>The county and the city will encourage the use of designated transport routes that bypass populated areas whenever possible.</b> This approach minimizes the likelihood of accidents occurring within city limits and reduces potential exposure to residents, businesses, and sensitive facilities. Coordinating with transportation agencies and industry partners strengthens safety along transport corridors and enhances community resilience to hazardous materials incidents.   | Hazardous materials release   | Low      | Low        | Hazardous Materials Emergency Preparedness Grant (PHMSA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS) | Dunn County Board of Commissioners*, Killdeer City Commission                            | 2030       |
| <b>KILLDEER</b>                 |  |   |          |            |  |  |            |

| ID   | Action   | Hazard(s)  | Priority | Cost     | Funding Mechanism  | Lead Party   | Time Frame |
|--|--|--|----------|----------|--|--|------------|
| K  | <b>The city will update its comprehensive plan to address current conditions, needs, and opportunities.</b> The current plan was adopted in 2019 but will be due for an update within the next five years, given changing conditions in the community. The update should include a revised future land use map that accounts for the hazards identified in the MHMP, and priority public improvements leading to a capital improvement plan (CIP), including projects that will specifically mitigate hazard risks (e.g., community storm shelters). | Severe winter weather, severe summer weather, flood, urban fire, hazardous materials release, transportation incident  | Moderate | High     | Killdeer General Budget<br>ND state planning grants (depending on program availability)  | City of Killdeer Planning Commission   | 2030       |
| <b>DODGE</b>   |  |  |          |          |  |  |            |
| L  | <b>The city will prepare a comprehensive plan that provides guidance for zoning and identifies priority infrastructure projects for completion.</b> This plan could include goals, strategies, and actions relating to emergency management and hazard mitigation. Developing this plan will strengthen the city's preparedness, improve interagency coordination, and enhance community resilience across a range of hazards.   | Severe summer weather, severe winter weather, flood, urban fire  | Moderate | Moderate | Dodge General Budget<br>ND state planning grants (depending on program availability)<br>North Dakota state   | City of Dodge City Clerk*,<br>Dunn County Emergency Manager  | 2028       |
| <b>HALLIDAY</b>  |  |  |          |          |  |  |            |
| M  | <b>The city will upgrade snow removal equipment to ensure roads remain clear and safe during blizzards, ice storms, and heavy snowfall.</b> Improved equipment will enhance the efficiency and reliability of snow removal operations and maintain access to critical facilities. By strengthening snow management capabilities, the city will be able to increase public safety and community resilience during extreme winter events.  | Severe winter weather  | High     | High     | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA) | City of Halliday City Commission   | 2026       |
| <b>ALL JURISDICTIONS (DUNN COUNTY, DODGE, DUNN CENTER, HALLIDAY, AND KILLDEER)</b> |  |  |          |          |  |  |            |
| N  | <b>All jurisdictions will acquire backup generators for critical facilities using a prioritized approach based on facility function, vulnerability, and community need.</b> Identifying and ranking essential sites such as emergency services, water systems, and public shelters will guide phased generator procurement. By ensuring reliable backup power jurisdictions will be able to enhance continuity of operations and strengthen community resilience during emergencies.   | Severe winter weather, severe summer weather, flood, wildland fire, urban fire, hazardous materials release, transportation incident, civil disturbance, space weather hazards | High     | High     | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA) | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator | 2030       |
| O  | <b>All jurisdictions will review existing emergency sheltering options and establish additional shelters where needed to ensure adequate capacity during extreme heat, storms, or other summer hazards.</b> This will include identifying accessible locations, ensuring necessary supplies, and coordinating staffing and communications. By expanding sheltering capacity, the jurisdictions will be able to enhance community safety and reduce vulnerability during severe summer weather events.  | Severe summer weather  | High     | High     | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA) | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator | 2026       |

| ID      | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism   | Lead Party   | Time Frame |
|---------|---|---|----------|------------|---|--|------------|
| P (new) | <b>All jurisdictions will identify locations to serve as community shelters or warming centers equipped with operable generators and sufficient emergency food and water supplies.</b> Plans for transporting residents will also be made if needed. Ensuring these facilities are fully functional during extreme cold or winter storms provides safe refuge for vulnerable populations. Establishing and maintaining these shelters strengthens community resilience and reduces risks to public health and safety during severe winter events. | Severe winter weather   | Moderate | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Water & Waste Disposal Loan & Grant Program (USDA)<br>Community Facilities Direct Loan & Grant Program (USDA)                                     | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator                                 | 2027       |
| Q       | <b>All jurisdictions will continue to administer and enforce burn restriction policies, especially during periods of elevated fire risk.</b> Regular enforcement, public outreach, and clear communication of restrictions will assist in the prevention of accidental ignitions and reduce the likelihood of uncontrolled fires. Maintaining this policy strengthens community safety and enhances long-term resilience to wildfire and urban fire events.   | Wildland fire   | Moderate | Staff time | General Budgets of each Jurisdiction  | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator                                 | Annually   |
| R       | <b>All jurisdictions will maintain and systematically upgrade firefighting, wildland suppression, and hazmat response equipment.</b> Regular assessments will guide replacement of outdated PPE, SCBAs, communications gear, and suppression tools, while prioritizing purchases for high-risk areas. These ongoing upgrades will reduce vulnerability by ensuring firefighter safety and strengthening the county's ability to contain fires or hazardous releases before they escalate.   | Urban and wildland fire   | High     | High       | Cohesive Fire Strategy Grants (USFS)<br>Assistance to Firefighters Grant (FEMA)   | Halliday Rural Fire Protection District*, West Dunn Fire District  | Annually   |
| S       | <b>All jurisdictions will follow Firewise program principles and promote best practices during wildfire season.</b> This includes encouraging residents to maintain defensible space, reduce vegetation hazards, and use fire-resistant materials around homes located in or near areas of concern. Implementing these practices will lower ignition potential and strengthen community-wide resilience to future wildfire events.  | Wildland fire   | Moderate | Staff time | General Budgets of each Jurisdiction  | Dunn County Emergency Manager*, Critical facility owners, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday Building Inspector, and City of Killdeer City Administrator | 2030       |
| T       | <b>All jurisdictions will install and maintain surge protection on critical equipment to prevent damage from lightning and power fluctuations.</b> Prioritized facilities may include emergency operations centers, communications systems, and essential public safety infrastructure. Maintaining surge protection will reduce equipment failure and minimize service disruptions, strengthening the county's ability to remain operational during severe storms.   | Severe summer weather, severe winter weather, space weather hazards | Moderate | Low        | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA) | Dunn County Emergency Manager*, Critical facility owners, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday Building Inspector, and City of Killdeer City Administrator | 2030       |
| U       | <b>All Jurisdictions will encourage utility providers to bury electric power lines in areas most vulnerable to outages from high winds, ice, and heavy snow.</b> Undergrounding lines will reduce the likelihood of weather-related damage and shorten restoration times after major storms. This effort will strengthen the reliability of critical utilities and improve community resilience during extreme weather events.  | Severe summer and severe winter weather                             | Low      | Staff time | Hazard Mitigation Grant Program (FEMA)<br>Grid Resilience and Innovation Partnerships Program (DOE)   | Dunn County Road Supervisor*, Dodge City Engineer, Dunn Center City Engineer, Killdeer City Engineer, and Halliday City Engineer   | 2030       |

| ID | Action  | Hazard(s)  | Priority | Cost       | Funding Mechanism  | Lead Party   | Time Frame |
|----|---|--|----------|------------|--|--|------------|
| V  | <b>All jurisdictions will complete physical improvements to culverts, roads, and bridges to reduce washouts, protect adjacent properties, and maintain access during high-water events.</b> Ongoing bridge and culvert inspections will identify structural deficiencies and prioritize upgrades in areas with recurring flooding or inadequate drainage capacity. These improvements will strengthen infrastructure resilience and reduce future flood-related damages and disruptions.  | Flooding, geologic hazards                       | Low      | High       | Hazard Mitigation Grant Program (FEMA)<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development Grant Program (USDOT) | Dunn County Road Supervisor*,<br>Dodge City Engineer, Dunn Center City Engineer, Killdeer City Engineer, and Halliday City Engineer  | 2030       |
| W  | <b>All jurisdictions will review floodplain management procedures and update information to incorporate findings from newly completed Flood Insurance Studies.</b> This ensures development regulations, permitting, and mitigation strategies reflect current flood risk and align with FEMA standards. By keeping floodplain management current the jurisdictions will be able to enhance public safety and reduce property damage during future flood events.  | Flooding   | Low      | Staff time | General Budgets of each Jurisdiction   | Dunn County Planning & Zoning Administrator*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday Building Inspector, and City of Killdeer City Administrator | 2026       |
| X  | <b>All jurisdictions will incorporate and administer stormwater management requirements for subdivisions and new development.</b> This includes implementing best management practices and erosion control measures to reduce runoff and minimize flood impacts. By strengthening stormwater management practices the jurisdictions will be able to help protect properties, infrastructure, and public safety while enhancing long-term community resilience to flooding.  | Flooding   | Moderate | Staff time | General Budgets of each Jurisdiction   | Dunn County Planning & Zoning Administrator*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday Building Inspector, and City of Killdeer City Administrator | 2030       |
| Y  | <b>All jurisdictions will encourage adequate buffering between hazardous materials risk locations, such as storage or transport facilities, and incompatible uses, including residences, schools, and critical infrastructure.</b> This may involve zoning updates, land-use planning, and coordination with industry to maintain safe distances and protective setbacks. Establishing these buffers reduces potential exposure, protects public safety, and strengthens community resilience to hazardous materials incidents. | Hazardous materials release                      | Moderate | Staff time | General Budgets of each Jurisdiction   | Dunn County Planning & Zoning Administrator*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator       | Annually   |
| Z  | <b>All jurisdictions will continue supporting the USDA Farm Service Agency and NDSU Extension.</b> This includes collaborating on data collection, monitoring programs, and outreach to provide farmers and residents with timely information on soil moisture, crop conditions, pest activity, and disease outbreaks. Supporting these agencies enhances long-term agricultural resilience and reduces the impact of drought and pest or disease events on the community.  | Drought, infectious disease and pest infestation | Moderate | Staff time | General Budgets of each Jurisdiction<br>Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)  | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator                     | 2030       |
| AA | <b>All jurisdictions will develop backup systems and implement enhanced cybersecurity measures to protect critical data and infrastructure.</b> This includes routine data backups, network monitoring, employee training, and protocols to quickly recover systems in the event of a breach. This action will strengthen cyber defenses and reduce the likelihood of operational disruptions while also enhancing the community's resilience against evolving digital threats.   | Cyber-attack                                     | Moderate | Med        | Department of Homeland Security<br>State Homeland Security Program and Urban Area Security Initiative Grants (DHS)   | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator                     | 2030       |

| ID          | Action   | Hazard(s)             | Priority | Cost       | Funding Mechanism   | Lead Party   | Time Frame |
|-------------|--|-----------------------|----------|------------|---|--|------------|
| BB          | <b>All jurisdictions will harden electrical components and systems for critical facilities, particularly emergency response services, by implementing protective measures such as EMP shielding and surge protection.</b> These upgrades will reduce the likelihood of equipment failure and maintain operational continuity during solar storms or other space weather events. Strengthening infrastructure in this way enhances community resilience and ensures critical services remain functional under extreme conditions.                                 | Space weather hazards | Low      | Med        | Hazard Mitigation Grant Program (FEMA)<br>Grid Resilience and Innovation Partnerships Program (DOE)   | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator | 2030       |
| CC<br>(new) | <b>All jurisdictions will provide annual public education relating to radon risk and encourage households and business to perform radon testing and mitigation.</b> Outreach may include signage at key destinations, materials at community centers and/or city halls, and information shared through county and city websites and social media. Increasing awareness among residents will strengthen overall preparedness.   | Geologic hazard       | Moderate | Staff time | Dunn County General Budget, State and Tribal Indoor Radon Grant (EPA)   | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator | Annually   |
| DD<br>(new) | <b>All jurisdictions will collaborate with one another to develop and implement a comprehensive drought resilience and water conservation program.</b> This will include identifying vulnerable water supply systems, promoting water conservation practices, encouraging drought-resilient agricultural techniques, and supporting the development of local drought contingency plans. The jurisdictions will strive to expand education and outreach efforts to inform residents and farmers / ranchers about drought risks and water conservation strategies. | Drought               | Moderate | Moderate   | Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)<br>General Budgets of each Jurisdiction | Dunn County Emergency Manager*, City of Dodge City Auditor, City of Dunn Center City Auditor, City of Halliday City Auditor, and City of Killdeer City Administrator | Annually   |

\*Lead for Mitigation Action

## Additional Notes for Dunn County Mitigation Actions

### Internal Communication System (A)

Interagency communication is essential during a hazardous event. Dunn County will continue to update and enhance communication systems as technology improves.

### Emergency Alert Systems (B)

Prompt alerts to significant emergencies are critical to saving lives and protecting property. The County should build on existing emergency messaging systems to improve their utility and effectiveness.

### Emergency Training Exercises (C)

Table top training has been demonstrated to be an effective low-cost way to train for many emergency events. Training exercises can be coordinated with other jurisdictions to balance responsibilities and create a broader impact. As an example, Dunn County recently participated in a plane crash simulation in Williston.

### Public Outreach and Education (D)

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

- Hazardous materials awareness/shelter-in-place for residents
- Summer and winter weather safety
- Weather resistant building best practices
- Flood safety and NFIP promotion
- Fire weather notifications and fire prevention best practices
- Water conservation techniques
- Security measures against cyber attacks

- Hardening electrical and electronic systems
- Infectious disease and pest control
- Dam/levee failures
- Use of all-hazard radios
- ND Vision Zero programs
- Travel emergency preparedness
- Drought

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

### Emergency Responder Staffing and Training (E)

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

### Outdoor Warning Sirens (F)

**This is a top priority for Dunn County.** Each city and responsible entity for outdoor gathering and recreation areas should assess need for outdoor warning sirens, and work with Dunn County Emergency Management to address these needs. The Little Mo Campground is one possible location identified by stakeholders.

### Snow Fences and Shelterbelts (G)

As an ongoing policy, the Dunn County Road Department encourages properly placed snow fences and shelterbelts to substantially reduce the location and frequency of snow blocked roads.

## NFIP Workshop (H)

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

## SW Health Coordination (I)

Southwest District Health has detailed emergency operational plans for health hazards including the outbreak of infectious disease. It is essential that each local governing body and relevant organizations coordinate in keeping these plans up to date and training for a potential health risk.

## Hazardous Materials Transport Routes (J)

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

## Killdeer Comprehensive Plan (K)

Killdeer's comprehensive plan was adopted in 2019 and is due to an update to reflect changed conditions in the community. The comprehensive plan provides support for zoning and can identify infrastructure priorities that can be incorporated into future capital improvement plans. Mitigation projects can be prioritized in the plan.

## Dodge Comprehensive Plan (L)

Dodge has a zoning ordinance and has made many recent infrastructure improvements. A comprehensive plan would provide

needed legal support for zoning, a housing strategy, policies to ensure protection of community assets, and an action plan for community needs.

## Halliday Snow Removal Equipment (M)

Current snow removal equipment for Halliday has nearly reached the end of its useful life. The existing equipment needs to be upgraded to meet the snow removal needs of the City, especially in the case of an emergency event.

## N. Backup Generators (N)

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

Critical facilities that could benefit from generator installation include the lift stations in Killdeer, the High Plains Community Center in Killdeer, the church in Dodge, and County Road Department buildings. Communities should also evaluate the power capacity of existing generators, which may need to be increased when buildings are expanded or to provide sufficient power for emergency sheltering purposes.

## Storm Shelters (O)

**This is a top priority for Dunn County.** High winds, hailstorms and tornadoes are a threat to public safety, especially for individuals who lack secure shelter or who become stranded outdoors. Mobile home parks and campgrounds are sites especially at risk. Grant money is available to pay for the majority of the cost of installing a storm

shelter. Existing community facilities with basements or reinforced construction may also be used as storm shelters.

Specific locations to evaluate include:

- The large campground on the east side of Killdeer
- The mobile home park in Halliday
- The mobile home park in Dunn Center
- Lake Ilo Recreation Area
- Little Mo Campground

### Winter Shelters (P)

Most North Dakota residents are prepared for severe winter weather – a common occurrence – and have the mentality to ride out the storm on their own. However, some people may need assistance, and in the event of a large-scale power outage, there should be a plan to utilize a community sheltering location such as a school or church for a day or more.

### Burn Restriction (Q)

Wildland fires and urban fires can be minimized by limiting open burning during seasons of high outdoor fire risk. Dunn County's burn restriction policy is an effective tool to reduce risk to life and property. All local jurisdictions are responsible for enforcing the policy and educating the public about the purpose of the regulations.

### Wildfire Response (R)

Wildland fires are a frequent event and major threat in Dunn County. The historical wildland fire frequency and difficult terrain both highlight the need for upgraded firefighting capacity. Urban and wildland fires and hazardous materials releases have the potential to impact a large share of Dunn County population.

### Firewise (S)

Firewise is a nationwide program produced by the National Fire Protection Association. Within North Dakota the program is operated by the state Forest Service. Firewise focuses on education for individual homeowners to help prepare homes for wildfire resistance. Each jurisdiction's role within this program is to educate residents about wildfire risks and mitigation activities they can do to reduce their individual risk.

### Surge Protection (T)

Lightning strikes and space weather hazards can cause significant damage to essential equipment. Surge protection is beneficial for any facility where a loss of power or equipment failure would hinder critical functions or public safety. This could apply to healthcare facilities, emergency services, water and waste treatment plants, industrial facilities, government buildings, and other uses.

### Electric Lines (U)

Power outages may cause some critical facilities and some residences to be without heat or electricity for essential functions for extended time periods. Burying power lines is a practical way to reduce the risk of power failure. However, burying underground lines is more expensive than constructing overhead lines and may not be a high priority for utilities, especially when repairing/replacing overhead lines. Undergrounding power lines is best achieved at the time of development and should be encouraged as development occurs.

### Road and Bridge Improvements (V)

Many roads could be at risk from flooding that disrupts transportation and damages infrastructure. Potential improvements include replacing aging and undersized culverts, elevating commonly

flood impacted roads and bridges, and making other physical improvements to minimize flooding impacts on the road network and nearby property. Routine inspection and maintenance are crucial for preventing washouts and structural failure. Taking these preventative measures can save money and eliminate transportation disruptions. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

### **Floodplain Management (W)**

Recently completed Flood Insurance Studies and the Risk MAP project have new information on areas at risk of flooding. This information should be incorporated into local development review processes. It is also an optimum time to review existing floodplain management procedures to enhance flood risk reduction capabilities.

### **Stormwater Management (X)**

Stormwater management requirements allow cities a systematic way to ensure development and infrastructure are adequately protected from localized flooding. Existing requirements may need to be updated in light of recently completed FIS and Risk MAP projects.

### **Y. Hazardous Material Buffers (Y)**

Existing subdivisions and developed areas are susceptible to health and safety risks from hazardous materials releases. Local governments should use their zoning authority to ensure that future industrial development does not encroach on incompatible uses. Although local governments do not control the siting of oil and gas facilities in North Dakota, they can use zoning to discourage dwellings and other incompatible uses from encroaching on those sites.

### **Z. Farm Agency Support (Z)**

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

### **Cybersecurity (AA)**

Cyber-attacks can cause costly impacts for local governments, schools, and other critical facilities. Strategies and solutions include multifactor authentication, security awareness training (e.g., fake phishing emails), and migrating to cloud-based storage. Agencies and organizations can also conduct simulated cyber-attacks to test the effectiveness of their cyber security system.

### **EMP Shields (BB)**

Loss of critical facilities electrical systems and functionality from a space weather event could have catastrophic consequences. EMP shields are one way to mitigate against a geomagnetic storm.

### **Radon Mitigation (CC)**

Radon is a widespread hazard in North Dakota and can cause long-term health impacts, including lung cancer. The entire state is within the EPA's Zone 1, meaning there is a high probability of radon being found in the soil. There are several mitigation strategies for radon exposure in households. Prior to mitigation, however, the lower levels of structures must be tested with simple Radon Test kits that can be acquired at local hardware stores or a variety of suppliers.

### **Drought Resilience and Water Conservation Program (DD)**

Drought poses a significant threat to rural jurisdictions due to their heavy reliance on agriculture and limited water supply infrastructure. Prolonged periods of below-average precipitation can reduce soil

moisture, leading to crop losses, reduced livestock productivity, and financial hardship for agricultural producers, which in turn affects the broader local economy. Strengthening regional coordination and promoting proactive drought planning will reduce the severity of economic, environmental, and public health impacts associated with drought, particularly in communities currently lacking drought-specific mitigation actions.

## GOLDEN VALLEY COUNTY ACTION PLAN

The previous Multi-Hazard Mitigation Plan contained 73 mitigation actions for all local governments in Golden Valley County, including 30 unique actions. (Many actions are applicable to multiple jurisdictions.) Several actions have been completed or remain ongoing. The 2025 MHMP builds on previous planning efforts by removing actions that have been completed or that communities deem to be no longer relevant, and by incorporating new or modified actions, as desired by the communities. **Appendix D** provides a status update for actions that were removed, retained, or completed.

**Table 49** presents the updated mitigation actions for Golden Valley County and the Cities of Beach, Golva, and Sentinel Butte. Actions identified for “all jurisdictions” apply to all cities and the county. Responsibility for implementation ultimately rests with each jurisdiction. The individual or agency responsible for overseeing implementation of mitigation projects for each jurisdiction is listed in the table. The actual person(s) performing the project may be different than the responsible party. Additional notes are included following the table.

Many actions are retained from the 2020 MHMP, although additional details have been added to clarify the action the reasons for inclusion. Several actions are wholly new, as indicated in the table. These actions reflect changing conditions and priorities. Throughout the table, high-priority items are highlighted in red.

**Table 49. Golden Valley County Mitigation Actions**

| ID                          | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism  | Lead Party                                | Time Frame |
|-----------------------------|---|---|----------|------------|--|---|------------|
| <b>GOLDEN VALLEY COUNTY</b> |   |   |          |            |  |   |            |
| A                           | <b>The county will maintain a communication system for all elements of the emergency response team and update it as needed to ensure compatibility with state systems and mutual aid partners.</b> Regular assessments and upgrades will address technological gaps, improve interoperability, and ensure reliable information sharing during emergencies. By strengthening communications, the county will enhance coordination and reduces response times to critical events.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)  | Golden Valley County<br>Emergency Manager | Annually   |
| B                           | <b>The county will ensure it has a reliable mass notification system capable of reaching all cell phones within the jurisdiction.</b> The system will include the development of pre-approved messaging templates for various hazard scenarios to ensure timely and clear communication. This action will enhance public awareness, enable faster protective actions, and increase overall community resilience during emergencies.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure  | Moderate | High       | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)   | Golden Valley County<br>Emergency Manager | 2027       |
| C                           | <b>The county will conduct annual joint training exercises, including tabletop and scenario-based drills, to practice coordinated responses for priority hazards.</b> These exercises will involve emergency responders, public agencies, and community partners to improve decision-making and refine operational plans. Regular joint training will strengthen preparedness and enhance interagency coordination, resulting in long-term community resilience to a variety of hazards.  | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | Staff time | Golden Valley County General Budget,<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Hazard Mitigation Grant Program (FEMA)<br>Hazardous Materials Emergency Preparedness Grant (PHMSA) | Golden Valley County<br>Emergency Manager | Annually   |
| D                           | <b>The county will acquire backup generators for critical facilities using a prioritized approach based on facility function, vulnerability, and community need.</b> Identifying and ranking essential sites such as emergency services, water systems, and public shelters will guide phased generator procurement. By ensuring reliable backup power jurisdictions will be able to enhance continuity of operations and strengthen community resilience during emergencies.   | Severe summer weather, severe winter weather, flood, urban fire, wildland fire, hazardous materials release, transportation incident, civil disturbance, space weather hazards  | High     | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA)   | Golden Valley County<br>Emergency Manager | 2030       |
| E                           | <b>The county will conduct public outreach and education to communicate hazard risks and community mitigation and response efforts, with targeted messaging for visitors and tourists.</b> Outreach may include signage at key destinations, informational materials at lodging facilities, and updates shared through county websites and social media platforms. As part of this effort, the county will incorporate dam failure-specific information into outreach materials. This will include maps of Beach Dam and Camel Butte Dam inundation areas and an explanation of local warning and alert systems as well as evacuation routes. | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, geological hazards, infectious disease & pest infestation               | High     | Staff time | Golden Valley County General Budget<br>Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA)   | Golden Valley County<br>Emergency Manager | 2030       |

| ID                                    | Action   | Hazard(s)  | Priority | Cost       | Funding Mechanism   | Lead Party   | Time Frame |
|---------------------------------------|--|--|----------|------------|---|--|------------|
| <b>GOLDEN VALLEY COUNTY AND BEACH</b> |  |  |          |            |   |  |            |
| F                                     | <b>The county and the city will encourage the use of snow fences and shelterbelts in areas prone to drifting and reduced visibility.</b> These measures will help keep roads clear, improve travel safety, and reduce maintenance demands during major winter storms. By expanding the use of snow-control practices, the county will be able strengthen overall community resilience and minimize disruptions caused by severe winter conditions.                     | Severe winter weather  | Low      | Staff Time | Golden Valley County General Budget<br>City of Beach General Budget<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (USDOT)         | Golden Valley Road Department*, City of Beach City Council, City of Beach City Auditor | 2030       |
| <b>BEACH</b>                          |  |  |          |            |   |  |            |
| G                                     | <b>The city will identify and pursue the preferred course of action to prevent failure of the Beach Dam, whether through structural improvement, full replacement, or reclamation.</b> This evaluation will consider engineering assessments, hazard potential, downstream impacts, and long-term maintenance needs. Implementing the selected solution will strengthen public safety and significantly reduce the risk of catastrophic dam-related flooding.          | Dam failure  | Moderate | Staff time | Hazard Mitigation Grant Program (FEMA)<br>Small Flood Control Projects – Section 205 (USACE)<br>Emergency Bank Protection Projects – Section 14 (USACE)                                     | City of Beach City Council, City of Beach City Auditor*                                | 2030       |
| H                                     | <b>The city will obtain and install a generator for Beach’s community center to ensure the facility can operate during power outages.</b> Maintaining reliable backup power will allow the center to function as an emergency shelter or coordination point during disasters. This improvement enhances continuity of services and strengthens community resilience across a range of hazard events.   | Severe winter weather, severe summer weather, flood, wildland fire, urban fire, hazardous materials release, transportation incident, civil disturbance, space weather hazards | High     | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA)  | City of Beach City Council, City of Beach City Auditor*                                | 2026       |
| I<br>(new)                            | <b>The city will install a digital, programmable sign to provide timely community updates on hazard risks and mitigation procedures.</b> The sign will share warnings, protective action guidance, and emergency announcements in highly visible locations. Improving real-time public communication will strengthen awareness, support quicker response, and enhance overall community resilience.  | Severe winter weather, severe summer weather, flood, wildland fire, urban fire, hazardous materials release, transportation incident, civil disturbance, geological hazards    | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA) | City of Beach City Council, City of Beach City Auditor*                                | 2026       |
| J                                     | <b>The city will continue upgrading waterlines and fire hydrants throughout the area to ensure adequate flow, pressure, and system reliability for firefighting.</b> These improvements will reduce the risk of water supply failures during fire response and help protect homes, businesses, and critical facilities. By strengthening water infrastructure the city will be able to enhance overall community safety and long-term resilience to urban fire events. | Urban fire   | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Water & Waste Disposal Loan & Grant Program (USDA)<br>Community Facilities Direct Loan & Grant Program (USDA)                                     | City of Beach City Council<br>City of Beach City Auditor*                              | 2030       |

| ID  | Action   | Hazard(s)  | Priority | Cost     | Funding Mechanism   | Lead Party  | Time Frame |
|---|--|--|----------|----------|---|---|------------|
| <b>SENTINEL BUTTE</b>   |  |  |          |          |   |   |            |
| K   | <b>The city will acquire a backup generator for the Sentinel Butte fire hall and community center to ensure these facilities remain operational during power outages.</b> Reliable backup power will support emergency response, sheltering, and community coordination during disasters. This improvement enhances continuity of services and strengthens overall community resilience.   | Severe winter weather, severe summer weather, flood, wildland fire, urban fire, hazardous materials release, transportation incident, civil disturbance, space weather hazards | High     | Moderate | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA)      | City of Sentinel Butte City Council   | 2027       |
| <b>ALL JURISDICTIONS (GOLDEN VALLEY COUNTY, BEACH, GOLVA, AND SENTINEL BUTTE)</b> |  |  |          |          |   |   |            |
| L   | <b>All jurisdictions will review the need for outdoor warning sirens and install or upgrade them in large outdoor gathering areas as appropriate.</b> This effort will include expanding siren capabilities to incorporate distinct flash flood and dam failure warning tones so the public can clearly differentiate these hazards from other emergency alerts. The evaluation will review Beach Dam and Camel Butte Dam inundation mapping, identify populations located downstream of dam/levee structures, and assess coverage gaps in high-traffic areas, campgrounds, recreational sites, and tourism destinations. Siren placement and upgrades will be prioritized to ensure that residents and visitors within potential flash flood and dam/levee failure impact areas receive timely, hazard-specific alerts. Enhancing the siren system strengthens public warning capabilities and improves overall community preparedness. | Severe summer weather, dam failure   | Moderate | Moderate | Hazard Mitigation Grant Program (FEMA)  | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council  | 2030       |
| M   | <b>All jurisdictions will review existing emergency sheltering options and establish additional shelters where needed to ensure adequate capacity during extreme heat, storms, or other summer hazards.</b> This will include identifying accessible locations, ensuring necessary supplies, and coordinating staffing and communications. By expanding sheltering capacity jurisdictions will be able to enhance community safety and reduce vulnerability during severe summer weather events.   | Severe summer weather  | High     | High     | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA)      | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council  | 2026       |
| N<br>(new)  | <b>All jurisdictions will identify locations to serve as community shelters or warming centers equipped with operable generators and sufficient emergency food and water supplies.</b> Plans for transporting residents will also be made if needed. Ensuring these facilities are fully functional during extreme cold or winter storms provides safe refuge for vulnerable populations. Establishing and maintaining these shelters strengthens community resilience and reduces risks to public health and safety during severe winter events.  | Severe winter weather  | High     | High     | Hazard Mitigation Grant Program (FEMA)<br>Water & Waste Disposal Loan & Grant Program (USDA)<br>Community Facilities Direct Loan & Grant Program (USDA) | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council  | 2026       |
| O   | <b>All jurisdictions will maintain and systematically upgrade firefighting, wildland suppression, and hazmat response equipment.</b> Regular assessments will guide replacement of outdated PPE, SCBAs, communications gear, and suppression tools, while prioritizing purchases for high-risk areas. These ongoing upgrades will reduce vulnerability by ensuring firefighter safety and strengthening the county's ability to contain fires or hazardous releases before they escalate.  | Wildland/urban fire, hazardous materials release   | High     | High     | Cohesive Fire Strategy Grants (USFS)<br>Assistance to Firefighters Grant (FEMA)   | Beach Central Fire Protection District*, Beach Volunteer Fire Department, Golva Fire Protection District, Golva Rural Fire Department, Sentinel Butte Volunteer Fire Department | Annually   |

| ID | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism   | Lead Party  | Time Frame |
|----|---|---|----------|------------|---|---|------------|
| P  | <b>All jurisdictions will annually review and revise plans to enhance training and for First Responders.</b> This process will identify gaps in capabilities and guide targeted training programs. Strengthening personnel readiness and resources improves response efficiency, reduces the severity of incidents, and enhances overall community resilience.  | Transportation incident   | High     | Staff time | Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Assistance to Firefighters Grant (FEMA)<br>Staffing for Adequate Fire and Emergency Response Grant (FEMA)<br>Hazardous Materials Emergency Preparedness Grant (PHMSA) | Beach Central Fire Protection District*, Beach Volunteer Fire Department, Golva Fire Protection District, Golva Rural Fire Department, Sentinel Butte Volunteer Fire Department   | Annually   |
| Q  | <b>All jurisdictions will adopt and enforce burn restriction policies, especially during periods of elevated fire risk.</b> Regular enforcement, public outreach, and clear communication of restrictions will assist in the prevention of accidental ignitions and reduce the likelihood of uncontrolled fires. Creating and maintaining such a policy strengthens community safety and enhances long-term resilience to wildfire and urban fire events.           | Wildland fire   | Moderate | Staff time | General Budgets of each Jurisdiction  | Beach Central Fire Protection District*, Beach Volunteer Fire Department, Golva Fire Protection District, Golva Rural Fire Department, Sentinel Butte Volunteer Fire Department   | Annually   |
| R  | <b>All jurisdictions will follow Firewise program principles and promote best practices during wildfire season.</b> This includes encouraging residents to maintain defensible space, reduce vegetation hazards, and use fire-resistant materials around homes located in or near areas of concern. Implementing these practices will lower ignition potential and strengthen community-wide resilience to future wildfire events.                                  | Wildland fire   | Moderate | Staff time | General Budgets of each Jurisdiction  | Beach Central Fire Protection District*, Beach Volunteer Fire Department, Golva Fire Protection District, Golva Rural Fire Department, Sentinel Butte Volunteer Fire Department, Golden Valley County Emergency Manager | 2030       |
| S  | <b>All jurisdictions will install and maintain surge protection on critical equipment to prevent damage from lightning and power fluctuations.</b> Prioritized facilities may include emergency operations centers, communications systems, and essential public safety infrastructure. Maintaining surge protection will reduce equipment failure and minimize service disruptions, strengthening the county's ability to remain operational during severe storms. | Severe summer weather, severe winter weather, space weather hazards | Moderate | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA)   | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council  | 2030       |
| T  | <b>All jurisdictions will encourage utility providers to bury electric power lines in areas most vulnerable to outages from high winds, ice, and heavy snow.</b> Undergrounding lines will reduce the likelihood of weather-related damage and shorten restoration times after major storms. This effort will strengthen the reliability of critical utilities and improve community resilience during extreme weather events.                                      | Severe winter weather and severe summer weather                     | Low      | Staff Time | Hazard Mitigation Grant Program (FEMA)<br>Grid Resilience and Innovation Partnerships Program (DOE)   | Planning & Zoning Commissions for: Golden Valley County*, City of Beach, City of Golva, City of Sentinel Butte  | 2030       |

| ID | Action  | Hazard(s)  | Priority | Cost       | Funding Mechanism  | Lead Party   | Time Frame |
|----|---|--|----------|------------|--|--|------------|
| U  | <b>All jurisdictions will complete physical improvements to culverts, roads, and bridges to reduce washouts, protect adjacent properties, and maintain access during high-water events.</b> Ongoing bridge and culvert inspections will identify structural deficiencies and prioritize upgrades in areas with recurring flooding or inadequate drainage capacity. These improvements will strengthen infrastructure resilience and reduce future flood-related damages and disruptions.  | Flooding, geologic hazards                       | Moderate | Staff time | Hazard Mitigation Grant Program (FEMA)<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development Grant Program (USDOT) | Golden Valley County Road Supervisor*, Beach City Engineer, Golva City Engineer, Sentinel Butte City Engineer  | 2030       |
| V  | <b>All jurisdictions will conduct NFIP workshops to educate the public on the benefits of flood insurance and how to assess individual property risk.</b> These workshops will provide guidance on policy options, mitigation strategies, and steps homeowners can take to reduce flood damage, such as elevating structures or improving drainage. Educating the community will increase awareness and encourage proactive risk reduction.   | Flooding   | Low      | Staff time | Hazard Mitigation Grant Program (FEMA)<br>General Budgets of each Jurisdiction   | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council   | 2026       |
| W  | <b>All jurisdictions will encourage adequate buffering between hazardous materials risk locations, such as storage or transport facilities, and incompatible uses, including residences, schools, and critical infrastructure.</b> This may involve zoning updates, land-use planning, and coordination with industry to maintain safe distances and protective setbacks. Establishing these buffers reduces potential exposure, protects public safety, and strengthens community resilience to hazardous materials incidents. | Hazardous materials release                      | Moderate | Staff time | General Budgets of each Jurisdiction   | Planning & Zoning Commissions for: Golden Valley County*, City of Beach, City of Golva, City of Sentinel Butte | Annually   |
| X  | <b>All jurisdictions will continue supporting the USDA Farm Service Agency and NDSU Extension.</b> This includes collaborating on data collection, monitoring programs, and outreach to provide farmers and residents with timely information on soil moisture, crop conditions, pest activity, and disease outbreaks. Supporting these agencies enhances long-term agricultural resilience and reduces the impact of drought and pest or disease events on the community.  | Drought, infectious disease and pest infestation | Med      | Staff time | General Budgets of each Jurisdiction<br>Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)  | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council   | 2030       |
| Y  | <b>All jurisdictions will coordinate with Southwest Health to maintain up-to-date emergency operational plans for infectious disease outbreaks and other critical incidents as well as conduct annual training exercises.</b> These efforts will ensure that staff are familiar with procedures and can efficiently respond to incidents. Ongoing coordination and training will improve overall preparedness, reduce response times, and strengthen community resilience to a wide range of hazards.                           | Infectious disease, hazardous material release   | High     | Staff time | General Budgets of each Jurisdiction<br>Public Health Emergency Preparedness Program (CDC)<br>Emergency Management Performance Grant (FEMA)  | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council   | 2030       |
| Z  | <b>All jurisdictions will develop backup systems and implement enhanced cybersecurity measures to protect critical data and infrastructure.</b> This includes routine data backups, network monitoring, employee training, and protocols to quickly recover systems in the event of a breach. This action will strengthen cyber defenses and reduce the likelihood of operational disruptions while also enhancing the community's resilience against evolving digital threats.   | Cyber-attack                                     | Moderate | Low        | Homeland Security Grant Program (DHS)  | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council   | 2027       |



| ID       | Action   | Hazard(s)             | Priority | Cost       | Funding Mechanism   | Lead Party   | Time Frame |
|----------|--|-----------------------|----------|------------|---|--|------------|
| AA       | <b>All jurisdictions will harden electrical components and systems for critical facilities, particularly emergency response services, by implementing protective measures such as EMP shielding and surge protection.</b> These upgrades will reduce the likelihood of equipment failure and maintain operational continuity during solar storms or other space weather events. Strengthening infrastructure in this way enhances community resilience and ensures critical services remain functional under extreme conditions.                                 | Space weather hazards | High     | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Grid Resilience and Innovation Partnerships Program (DOE)   | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council | 2030       |
| BB       | <b>All jurisdictions will provide annual public education relating to radon risk and encourage households and business to perform radon testing and mitigation.</b> Outreach may include signage at key destinations, materials at community centers and/or city halls, and information shared through county and city websites and social media. Increasing awareness among residents will strengthen overall preparedness.   | Geologic hazard       | Moderate | Staff time | Golden Valley County General Budget<br>State and Tribal Indoor Radon Grant (EPA)  | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council | Annually   |
| CC (new) | <b>All jurisdictions will collaborate with one another to develop and implement a comprehensive drought resilience and water conservation program.</b> This will include identifying vulnerable water supply systems, promoting water conservation practices, encouraging drought-resilient agricultural techniques, and supporting the development of local drought contingency plans. The jurisdictions will strive to expand education and outreach efforts to inform residents and farmers / ranchers about drought risks and water conservation strategies. | Drought               | Moderate | Moderate   | Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)<br>General Budgets of each Jurisdiction | Golden Valley County Emergency Manager*, Beach City Council, Golva City Council, Sentinel Butte City Council | Annually   |

\*Lead for Mitigation Action



## Additional Notes for Golden Valley Mitigation Actions

### Internal Communication System (A)

It is vital that all emergency responders in the county maintain a robust system that allows high quality radio/cellular communications internally and with the statewide system. When the state upgrades its communication infrastructure, some elements of the county's communication system may become outdated or obsolete. For example, old sirens may not be compatible with system upgrades. Golden Valley has modernized its radio communications system while retaining VHF infrastructure to communicate with its mutual aid partners. Golden Valley County will continue to update and enhance communication systems as technology improves.

### Emergency Alert Systems (B)

Prompt alerts to significant emergencies are critical to saving lives and protecting property. The County emergency response operations should have a tool in place to issue such alerts to the appropriate geographic areas of the County. Golden Valley County currently uses CodeRED, which sends alerts to subscribers. Other options are IPAWS and/or TextMyGov.

### Emergency Training Exercises (C)

Table top training has been demonstrated to be an effective low-cost way to train for many emergency events. Training exercises can be coordinated with other jurisdictions to balance responsibilities and create a broader impact. Dunn County recently participated in a plane crash simulation in Williston.

### Backup Generators (D).

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

Within the last five years, backup generators have been acquired for the Beach Fire Hall, Beach Ambulance, and the Golva Fire Hall.

### Public Outreach and Education (E)

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

- Hazardous materials awareness/shelter-in-place for residents
- Summer and winter weather safety
- Weather resistant building best practices
- Flood safety and NFIP promotion
- Fire weather notifications and fire prevention best practices
- Water conservation techniques
- Security measures against cyber attacks
- Hardening electrical and electronic systems
- Infectious disease and pest control
- Dam/levee failures
- Use of all-hazard radios
- ND Vision Zero programs
- Travel emergency preparedness
- Drought

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

### **Snow Fences and Shelterbelts (F)**

As an ongoing policy, the Golden Valley County Road Department encourages properly placed snow fences and shelterbelts to substantially reduce the location and frequency of snow blocked roads. The City of Beach also has used snow fences effectively and would like to have more.

### **Beach Dam Mitigation (G)**

A Beach Dam failure would result in flooding in parts of the city. An analysis of worst-case impacts on the city would allow it to identify areas where to limit development. Cost estimates provided by stakeholders were \$1 million to improve the dam and \$1.3 million to replace it. Beach is exploring various grant options to rebuild or reclaim the dam.

### **Community Center Generator (H)**

Blizzards, other severe winter weather, and severe summer weather can cause power outages that may last for days. Beach's community center is one of the designated emergency shelters but does not have an emergency generator.

### **Dynamic Messaging Sign (I)**

A digital sign on 1<sup>st</sup> Ave NW (CR 16) would help communicate messages to residents of Beach and Golva, and the county more broadly. Stakeholders mentioned that not everyone is signed up for CodeRED alerts and that people tend to get inoculated to emergency notifications after a while and may ignore/disable them. A digital sign would have widespread utility to communicate about hazards as well as general community events. A standard outdoor digital sign can be purchased for \$20,000.

### **Beach Water Supply Improvements (J)**

Old and undersized watermains limit fire firefighting capacity. In the past five years, Beach has completed improvements in the south-central area of town. The southwest corner will be improved within the next two years, to be followed by the north side.

### **Sentinel Butte Community Center Generator (K)**

The community hall is a critical facility for the city. It is a well-built structure. Relatively minor changes could enhance its ability to serve as a shelter. A backup generator will ensure operational continuity in emergencies.

### **Warning Sirens (L)**

Each city and responsible entity for outdoor gathering and recreation areas should assess the need for outdoor warning sirens, and work with Golden Valley County Emergency Management to address these needs. There are six sirens in Golden Valley County – three in Beach, two in Golva, and one in Sentinel Butte. All are old but in working order, with parts replaced as they become obsolete (e.g., new control boards). Sirens that are no longer working are eligible for funding/full replacement.

### **Storm Shelters (M)**

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

Mobile home parks and campgrounds are sites especially at risk. Potential shelters include community centers and fire halls with backup power supply. Community buildings with basements include churches and the bar in Beach.

## Winter Shelters (N)

Most North Dakota residents are prepared for severe winter weather – a common occurrence – and have the mentality to ride out the storm on their own. However, some people may need assistance, and in the event of a large-scale power outage, there should be a plan to utilize a community sheltering location such as a school or church for a day or more.

## Emergency Response Equipment Upgrades (O)

Urban and wildland fires and hazardous materials releases have the potential to impact a large share of the Golden Valley County population. It is important to upgrade and maintain equipment.

## First Responder Training (P)

The responders closest to the scene of a criminal attack, transportation incident, or hazardous materials release may not be those typically equipped to handle these emergencies. Increasing training and equipment availability for them can potentially limit the level of property loss or injury from such incidents. Joint training between local Fire Departments and Emergency Medical Service providers is an effective way to improve preparedness and response for multiple hazards. While many rural communities struggle with staffing, this is a strength for Golden Valley. The Beach Fire District currently has about 30 volunteers and sends 12 people to State Fire School on an annual basis. Golva and Sentinel Butte have good crews as well.

## Burn Restriction (Q)

Wildland fires and urban fires can be minimized by limiting open burning during seasons of high outdoor fire risk. Establishing and enforcing a burn ban can be an effective tool to reduce risk to life and

property. Golden Valley County's burn restriction policy is an effective tool to reduce risk to life and property. All local jurisdictions are responsible for enforcing the policy and educating the public about the purpose of the regulations.

## Firewise (R)

Firewise is a nationwide program produced by the National Fire Protection Association. Within North Dakota the program is operated by the state Forest Service. Firewise focuses on education for individual homeowners to help prepare homes for wildfire resistance. Each jurisdiction's role within this program is to educate residents about wildfire risks and mitigation activities they can do to reduce their individual risk, such as maintaining defensible space and using fire-resistant construction materials.

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

## Surge Protection (S)

Lightning strikes can cause significant damage to essential equipment and data. Recently, severe summer weather damaged one of the base stations at the County Courthouse. The Dispatch Center has a backup battery and surge protection system.

Surge protection is beneficial for any facility where a loss of power or equipment failure would hinder critical functions or public safety. This could apply to healthcare facilities, emergency services, water and waste treatment plants, industrial facilities, government buildings, and other uses.

## Electric Lines (T)

Power outages may cause some critical facilities and residences to be without heat or electricity for essential functions for extended time periods. Burying power lines is a practical way to reduce the risk of power failure. However, burying underground lines is more expensive than constructing overhead lines and may not be a high priority for utilities, especially when repairing/replacing overhead lines. Undergrounding power lines is best achieved at the time of development and should be encouraged as development occurs.

## Road and Bridge Improvements (U)

Past flood events resulted in extensive damage to roads and bridges in rural Golden Valley County. Many roads could be at risk from flooding that disrupts transportation and damages infrastructure. Potential improvements include replacing aging and undersized culverts, elevating commonly flood impacted roads and bridges, and making other physical improvements to minimize flooding impacts on the road network and nearby property. Routine inspection and maintenance are crucial for preventing washouts and structural failure. Taking these preventative measures can save money and eliminate transportation disruptions. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

## NFIP Workshop (V)

Workshops would be targeted at educating residents not required to buy flood insurance but still at risk for flooding. Technical assistance for a workshop is available from the North Dakota State Water Commission. A workshop could be conducted by the County in a central location, or rotating workshops could be held in each

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

## Hazardous Material Buffers (W)

While new development areas are not anticipated, existing subdivisions and developed areas are susceptible to health and safety risks from hazardous materials releases. Local governments should use their zoning authority to ensure that future industrial development does not encroach on incompatible uses. Although local governments do not control the siting of oil and gas facilities in North Dakota, they can use zoning to discourage dwellings and other incompatible uses from encroaching on those sites.

## Farm Agency Support (X)

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

## SW Health Coordination (Y)

Southwest District Health has detailed emergency operational plans for health hazards including the outbreak of infectious disease. It is essential that each local governing body and relevant organizations coordinate in keeping these plans up to date and training for a potential health risk.

## Cybersecurity (Z)

Cyber-attacks can cause costly impacts for local governments, schools, and other critical facilities. Strategies and solutions include multifactor authentication, security awareness training (e.g., fake phishing emails), and migrating to cloud-based storage. Agencies and organizations can also conduct simulated cyber-attacks to test the effectiveness of their cyber security system.

## **EMP Shields (AA)**

Loss of critical power and communication systems from a space weather event could have catastrophic consequences. EMP shields are one way to protect against a geomagnetic storm.

## **Radon Mitigation (BB)**

Radon is a widespread hazard in North Dakota and can cause long-term health impacts, including lung cancer. The entire state is within the EPA's Zone 1, meaning there is a high probability of radon being found in the soil. There are several mitigation strategies for radon exposure in households. Prior to mitigation, however, the lower levels of structures must be tested with simple Radon Test kits that can be acquired at local hardware stores or a variety of suppliers.

## **Drought Resilience and Water Conservation Program (CC)**

Drought poses a significant threat to rural jurisdictions due to their heavy reliance on agriculture and limited water supply infrastructure. Prolonged periods of below-average precipitation can reduce soil moisture, leading to crop losses, reduced livestock productivity, and financial hardship for agricultural producers, which in turn affects the broader local economy. Strengthening regional coordination and promoting proactive drought planning will reduce the severity of economic, environmental, and public health impacts associated with drought, particularly in communities currently lacking drought-specific mitigation actions.

## STARK COUNTY ACTION PLAN

The previous Multi-Hazard Mitigation Plan contained 126 mitigation actions for all local governments in Stark County, including 40 unique actions. (Many actions are applicable to multiple jurisdictions.) Several actions have been completed or remain ongoing. The 2025 MHMP builds on previous planning efforts by removing actions that have been completed or that communities deem to be no longer relevant, and by incorporating new or modified actions, as desired by the communities. **Appendix D** provides a status update for actions that were removed, retained, or completed.

**Table 50** presents the updated mitigation actions for Stark County and the Cities of Belfield, Dickinson, Gladstone, Richardton, South Heart, and Taylor. Actions identified for “all jurisdictions” apply to all cities and the county. Responsibility for implementation ultimately rests with each jurisdiction. The individual or agency responsible for overseeing implementation of mitigation projects for each jurisdiction is listed in the table. The actual person(s) performing the project may be different than the responsible party. Actions that are new for the 2025 MHMP are indicated as such. Additional notes are included following the table.

Many actions are retained from the 2020 MHMP, although additional details have been added to clarify the action the reasons for inclusion. Several actions are wholly new, as indicated in the table. These actions reflect changing conditions and priorities.

**Table 50. Stark County Mitigation Actions**

| ID                  | Action   | Hazard(s)   | Priority | Cost       | Funding Mechanism   | Lead Party                     | Time Frame |
|---------------------|--|---|----------|------------|---|--------------------------------|------------|
| <b>STARK COUNTY</b> |  |   |          |            |   |                                |            |
| A                   | <b>The county will maintain a communication system for all elements of the emergency response team and update it as needed to ensure compatibility with state systems and mutual aid partners.</b> Regular assessments and upgrades will address technological gaps, improve interoperability, and ensure reliable information sharing during emergencies. By strengthening communications, the county will enhance coordination and reduces response times to critical events.  | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | Low        | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)   | Stark County Emergency Manager | Annually   |
| B                   | <b>The county will ensure it has a reliable mass notification system capable of reaching all cell phones within the jurisdiction.</b> The system will include the development of pre-approved messaging templates for various hazard scenarios to ensure timely and clear communication. This action will enhance public awareness, enable faster protective actions, and increase overall community resilience during emergencies.  | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure  | Moderate | Staff time | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)  | Stark County Emergency Manager | 2030       |
| C                   | <b>The county will conduct annual joint training exercises, including tabletop and scenario-based drills, to practice coordinated responses for priority hazards.</b> These exercises will involve emergency responders, public agencies, and community partners to improve decision-making and refine operational plans. Regular joint training will strengthen preparedness and enhance interagency coordination, resulting in long-term community resilience to a variety of hazards.   | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, cyber-attack, geological hazards, infectious disease & pest infestation | High     | Staff time | Stark County General Budget, Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Hazard Mitigation Grant Program (FEMA)<br>Hazardous Materials Emergency Preparedness Grant (PHMSA) | Stark County Emergency Manager | Annually   |
| D                   | <b>The county will conduct public outreach and education to communicate hazard risks and community mitigation and response efforts, with targeted messaging for visitors and tourists.</b> Outreach may include signage at key destinations, informational materials at lodging facilities, and updates shared through county websites and social media platforms. As part of this effort, the county will incorporate dam failure-specific information into outreach materials. This will include maps of Dickinson Dam, Queen City Dam, and Belfield Railroad Dam inundation areas and an explanation of local warning and alert systems as well as evacuation routes. | Wildland fire, urban fire, hazardous materials release, flood, severe winter weather, severe summer weather, transportation incident, civil disturbance, dam failure, geological hazards, infectious disease & pest infestation               | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA)                               | Stark County Emergency Manager | 2030       |
| E                   | <b>The county will coordinate with Southwest Health to maintain up-to-date emergency operational plans for infectious disease outbreaks and other critical incidents as well as conduct annual training exercises.</b> These efforts will ensure that staff are familiar with procedures and can efficiently respond to incidents. Ongoing coordination and training will improve overall preparedness, reduce response times, and strengthen community resilience to a wide range of hazards.   | Infectious disease, hazardous material release  | Varies   | Staff time | Stark County General Budget<br>Public Health Emergency Preparedness Program (CDC)<br>Emergency Management Performance Grant (FEMA)  | Stark County Emergency Manager | 2026       |

| ID               | Action   | Hazard(s)  | Priority | Cost       | Funding Mechanism   | Lead Party  | Time Frame |
|------------------|--|--|----------|------------|---|---|------------|
| F                | <b>The county will establish joint training exercises involving all First Responder agencies and increase the availability of critical response equipment.</b> These exercises will improve coordination and ensure personnel are prepared to respond effectively to emergencies such as fires, hazardous materials incidents, floods, and severe weather events. Strengthening training and equipment readiness enhances overall emergency response capacity and builds long-term community resilience. | Urban fires, wildland fires, hazardous materials release, severe summer weather, severe winter weather | Moderate | High       | Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Assistance to Firefighters Grant (FEMA)<br>Staffing for Adequate Fire and Emergency Response Grant (FEMA)<br>Hazardous Materials Emergency Preparedness Grant (PHMSA)           | Stark County Emergency Manager  | 2030       |
| G                | <b>The county will encourage the use of snow fences and shelterbelts in areas prone to drifting and reduced visibility.</b> These measures will help keep roads clear, improve travel safety, and reduce maintenance demands during major winter storms. By expanding the use of snow-control practices, the county will be able to strengthen overall community resilience and minimize disruptions caused by severe winter conditions.   | Severe winter weather  | Low      | High       | Stark County General Budget<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (USDOT)   | Stark County Road Department  | 2030       |
| H                | <b>The county will continue encouraging the agricultural sector to implement water and soil conservation practices.</b> This includes promoting techniques such as crop rotation, cover crops, reduced tillage, and efficient irrigation methods to maintain soil health and optimize water use. Supporting these practices helps reduce the impact of drought on agricultural productivity and strengthens long-term community and ecosystem resilience.  | Drought  | Low      | Staff time | Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)<br>Stark County General Budget  | Stark County Farm Service Agency, Stark County Emergency Manager*   | 2030       |
| I                | <b>The county will continue encouraging the agricultural sector to participate in crop insurance programs.</b> These programs provide financial protection against losses from drought, pest outbreaks, or disease impacts, helping farmers recover and maintain operations. Promoting insurance participation enhances agricultural resilience and reduces the long-term economic and community impacts of these hazards.   | Drought, infectious disease and pest infestation   | Low      | Staff time | Stark County General Budget   | Stark County Farm Service Agency, Stark County Emergency Manager*   | 2030       |
| <b>BELFIELD</b>  |  |  |          |            |   |   |            |
| J                | <b>The city will continue efforts to mitigate property damage from slumping along the river.</b> This includes monitoring unstable areas, implementing erosion control measures, and reinforcing riverbanks to prevent further land movement. Strengthening these protections reduces the risk to structures and critical infrastructure.  | Geological hazard  | Moderate | Moderate   | Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development (USDOT)<br>Hazard Mitigation Grant Program (FEMA)<br>Emergency Bank Protection Projects – Section 14 (USACE) | City of Belfield City Council, City of Belfield Planning & Zoning Commission*   | 2030       |
| <b>DICKINSON</b> |  |  |          |            |   |   |            |
| K                | <b>The city will complete downtown drainage improvements to reduce flooding at the South Main Avenue railroad underpass.</b> Upgrades may include enhanced stormwater conveyance, culvert improvements, and surface grading to manage runoff more effectively. By improving drainage in this area the city will be able to more effectively protect property and maintain roadway access during flood events.  | Flooding   | High     | High       | Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development (USDOT), Hazard Mitigation Grant Program (FEMA)  | City of Dickinson City Commission, City of Dickinson Planning & Zoning Commission, City of Dickinson Public Works Department* | 2030       |

| ID   | Action   | Hazard(s)  | Priority | Cost       | Funding Mechanism  | Lead Party  | Time Frame |
|--|--|--|----------|------------|--|---|------------|
| L  | <b>The city will complete an Emergency Action Plan for the Queen City Dam.</b> The plan will outline procedures for monitoring dam conditions, issuing warnings, evacuating affected areas, and coordinating emergency response among local agencies. By implementing this plan, the city will be able to enhance public safety and reduce potential property damage in the event of a dam-related emergency.  | Dam failure  | Moderate | Staff time | City of Dickinson General Budget<br>Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)  | City of Dickinson City Commission, City of Dickinson Planning & Zoning Commission, City of Dickinson Public Works Department* | 2027       |
| M  | <b>The city will evaluate opportunities for additional north-south access across transportation barriers and consider an additional east emergency access route.</b> Improved access will ensure emergency responders and residents / visitors can reach critical areas during hazardous events. By enhancing roadway connectivity, the city will be able to reduce emergency response times and maintain evacuation options during emergencies.   | Transportation incident, flood, severe winter weather, severe summer weather, wildland fire, urban fire, hazardous materials release | Low      | Staff time | Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development (USDOT)<br>Hazard Mitigation Grant Program (FEMA) | City of Dickinson City Commission, City of Dickinson Planning & Zoning Commission, City of Dickinson Public Works Department* | 2030       |
| <b>RICHARDTON</b>                            |  |  |          |            |  |   |            |
| N  | <b>The city will design and construct additional water storage to meet both municipal supply needs and firefighting demands.</b> Expanding storage capacity ensures adequate water flow and pressure for suppression efforts during fires, protecting homes, businesses, and critical infrastructure. By strengthening water resources, the city will be able to enhance fire response capabilities and build long-term community resilience to both urban and wildland fire hazards.                    | Urban and wildland fire  | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Water & Waste Disposal Loan & Grant Program (USDA)<br>Community Facilities Direct Loan & Grant Program (USDA)  | City of Richardton Public Works Department  | 2027       |
| <b>SOUTH HEART</b>                           |  |  |          |            |  |   |            |
| O  | <b>The city will complete stormwater drainageway improvements to reduce the risk and impact of localized flooding.</b> These enhancements may include clearing and grading drainage channels, the installation of culverts or retention structures, and improving runoff management to prevent water from accumulating in vulnerable areas. Strengthening stormwater infrastructure protects property and maintains safe access during flood events.   | Flooding   | High     | High       | Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development (USDOT)<br>Hazard Mitigation Grant Program (FEMA) | City of South Heart City Commission   | 2027       |
| <b>STARK COUNTY, BELFIELD, AND DICKINSON</b> |  |  |          |            |  |   |            |
| P  | <b>The county, as well as the cities of Belfield and Dickinson, will encourage the use of designated transport routes that bypass populated areas whenever possible.</b> This strategy minimizes the potential for accidents within vulnerable areas and reduces exposure risk for residents, businesses, and critical infrastructure. Coordinating with transportation agencies and industry partners will enhance overall safety and strengthen community resilience to hazardous materials incidents. | Hazardous materials release  | Moderate | Staff time | Hazardous Materials Emergency Preparedness Grant (USDOT)<br>Hazard Mitigation Grant Program  | Stark County Emergency Manager*, City of Belfield City Council, City of Dickinson City Commission                             | 2030       |



| ID   | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism   | Lead Party   | Time Frame |
|--|---|---|----------|------------|---|--|------------|
| Q  | <b>The county, as well as the cities of Belfield and Dickinson, will obtain drones or similar technology along with certified staff to broaden disaster response capabilities.</b> Drones can provide real-time aerial imagery, as well as damage assessment and situational awareness for hazards such as wildland and urban fires, floods, hazardous materials releases, transportation incidents, geological hazards, severe summer and winter weather, and civil disturbances. By integrating this technology, the jurisdictions will be able to enhance response efficiency and improves decision-making across a wide range of hazard scenarios.  | Wildland fire, urban fire, flood, hazardous materials release, transportation incident, geological hazards, severe summer weather, civil disturbance, severe winter weather | Moderate | Moderate   | Homeland Security Grant Program (DHS)<br>Emergency Preparedness Grant (FEMA)<br>Assistance to Firefighters Grant (FEMA)<br>Pipeline and Hazardous Materials<br>Emergency Preparedness Grant (PHMSA) | Stark County Emergency Manager*, City of Belfield City Council, City of Dickinson City Commission  | 2026       |
| <b>ALL JURISDICTIONS (STARK COUNTY, BELFIELD, DICKINSON, GLADSTONE, RICHARDTON, SOUTH HEART, AND TAYLOR)</b> |   |   |          |            |   |  |            |
| R  | <b>All jurisdictions will conduct NFIP workshops to educate the public on the benefits of flood insurance and how to assess individual property risk.</b> These workshops will provide guidance on policy options, mitigation strategies, and steps homeowners can take to reduce flood damage, such as elevating structures or improving drainage. Educating the community will increase awareness and encourage proactive risk reduction.   | Flooding  | Moderate | Staff time | General Budgets of each Jurisdiction<br>Hazard Mitigation Grant Program (FEMA),   | Stark County Emergency Manager*, Stark County Floodplain Administrator (P&Z Administrator), Belfield City Auditor, Dickinson City Auditor, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor | 2026       |
| S  | <b>All jurisdictions will review floodplain management procedures and update information to incorporate findings from newly completed Flood Insurance Studies.</b> This ensures development regulations, permitting, and mitigation strategies reflect current flood risk and align with FEMA standards. By keeping floodplain management current the jurisdictions will be able to enhance public safety and reduce property damage during future flood events.  | Flooding  | High     | Staff time | General Budgets of each Jurisdiction  | Stark County Floodplain Administrator (P&Z Administrator)*, Belfield City Auditor, Dickinson City Auditor, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor                                 | 2026       |
| T  | <b>All jurisdictions will review the need for outdoor warning sirens and install or upgrade them in large outdoor gathering areas as appropriate.</b> This effort will include expanding siren capabilities to incorporate distinct flash flood and dam failure warning tones so the public can clearly differentiate these hazards from other emergency alerts. The evaluation will review Dickinson Dam, Queen City Dam, and Belfield Railroad Dam inundation mapping, identify populations located downstream of dam/levee structures, and assess coverage gaps in high-traffic areas, campgrounds, recreational sites, and tourism destinations. Siren placement and upgrades will be prioritized to ensure that residents and visitors within potential flash flood and dam/levee failure impact areas receive timely, hazard-specific alerts. Enhancing the siren system strengthens public warning capabilities and improves overall community preparedness. | Severe summer weather, hazardous materials release, wildland fire, flood, dam failure   | Moderate | Moderate   | Hazard Mitigation Grant Program (FEMA)  | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Auditor, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor  | 2030       |

| ID | Action  | Hazard(s)  | Priority | Cost       | Funding Mechanism   | Lead Party   | Time Frame |
|----|---|--|----------|------------|---|--|------------|
| U  | <b>All jurisdictions will review existing emergency sheltering options and establish additional shelters where needed to ensure adequate capacity during extreme heat, storms, or other summer hazards.</b> This will include identifying accessible locations, ensuring necessary supplies, and coordinating staffing and communications. By expanding sheltering capacity jurisdictions will be able to enhance community safety and reduce vulnerability during severe summer weather events.  | Severe summer weather                                  | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Community Facilities Direct Loan & Grant Program (USDA)      | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor  | 2030       |
| V  | <b>All jurisdictions will identify locations to serve as community shelters or warming centers equipped with operable generators and sufficient emergency food and water supplies.</b> Plans for transporting residents will also be made if needed. Ensuring these facilities are fully functional during extreme cold or winter storms provides safe refuge for vulnerable populations. Establishing and maintaining these shelters strengthens community resilience and reduces risks to public health and safety during severe winter events. | Severe winter weather                                  | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Water & Waste Disposal Loan & Grant Program (USDA)<br>Community Facilities Direct Loan & Grant Program (USDA) | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor  | 2030       |
| W  | <b>All jurisdictions will maintain and systematically upgrade firefighting, wildland suppression, and hazmat response equipment.</b> Regular assessments will guide replacement of outdated PPE, SCBAs, communications gear, and suppression tools, while prioritizing purchases for high-risk areas. These ongoing upgrades will reduce vulnerability by ensuring firefighter safety and strengthening the county's ability to contain fires or hazardous releases before they escalate.   | Wildland fire, urban fire, hazardous materials release | High     | High       | Cohesive Fire Strategy Grants (USFS)  | Belfield Volunteer Fire Department, Dickinson Fire Department*, Gladstone Consolidated Fire Department, Richardton Fire Department, South Heart Fire Protection District, Taylor Rural Fire Department                                 | Annually   |
| X  | <b>All jurisdictions will continue to enforce burn restriction policies, especially during periods of elevated fire risk.</b> Regular enforcement, public outreach, and clear communication of restrictions will assist in the prevention of accidental ignitions and reduce the likelihood of uncontrolled fires. Maintaining such a policy strengthens community safety and enhances long-term resilience to wildfire and urban fire events.  | Wildland fire  | High     | Staff time | General Budgets of Each Jurisdiction  | Stark County Emergency Manager*, Belfield Police Department, Dickinson Police Department, South Heart Police Department, Stark County Sheriff's Department   | Annually   |
| Y  | <b>All jurisdictions will follow Firewise program principles and promote best practices during wildfire season.</b> This includes encouraging residents to maintain defensible space, reduce vegetation hazards, and use fire-resistant materials around homes located in or near areas of concern. Implementing these practices will lower ignition potential and strengthen community-wide resilience to future wildfire events.  | Wildland fire  | Moderate | Staff time | General Budgets of Each Jurisdiction  | Stark County Emergency Manager*, Belfield Volunteer Fire Department, Dickinson Fire Department, Gladstone Consolidated Fire Department, Richardton Fire Department, South Heart Fire Protection District, Taylor Rural Fire Department | 2030       |

| ID | Action  | Hazard(s)   | Priority | Cost       | Funding Mechanism  | Lead Party  | Time Frame |
|----|---|---|----------|------------|--|---|------------|
| Z  | <b>All jurisdictions will install and maintain surge protection on critical equipment to prevent damage from lightning and power fluctuations.</b> Prioritized facilities may include emergency operations centers, communications systems, and essential public safety infrastructure. Maintaining surge protection will reduce equipment failure and minimize service disruptions, strengthening the county's ability to remain operational during severe storms.   | Severe summer weather, severe winter weather, space weather hazards | Moderate | Moderate   | Hazard Mitigation Grant Program (FEMA)<br>Emergency Management Performance Grant (FEMA)<br>Homeland Security Grant Program (DHS)<br>Community Facilities Direct Loan & Grant Program (USDA)                                  | Critical facility owners, Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor | 2030       |
| AA | <b>All jurisdictions will complete physical improvements to culverts, roads, and bridges to reduce washouts, protect adjacent properties, and maintain access during high-water events.</b> Ongoing bridge and culvert inspections will identify structural deficiencies and prioritize upgrades in areas with recurring flooding or inadequate drainage capacity. These improvements will strengthen infrastructure resilience and reduce future flood-related damages and disruptions.  | Geologic hazards, flooding  | High     | High       | Hazard Mitigation Grant Program (FEMA)<br>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (USDOT)<br>Better Utilizing Investments to Leverage Development Grant Program (USDOT) | Stark County Road Supervisor*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor                             | 2030       |
| BB | <b>All jurisdictions will encourage adequate buffering between hazardous materials risk locations, such as storage or transport facilities, and incompatible uses, including residences, schools, and critical infrastructure.</b> This may involve zoning updates, land-use planning, and coordination with industry to maintain safe distances and protective setbacks. Establishing these buffers reduces potential exposure, protects public safety, and strengthens community resilience to hazardous materials incidents. | Hazardous materials release   | Moderate | Staff time | General Budgets of All Jurisdictions   | Stark County Board of Commissioners*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor                      | Annually   |
| CC | <b>All jurisdictions will increase regional training and coordination among emergency responders, public agencies, and industry partners.</b> This includes joint exercises, scenario-based drills, and shared protocols to improve preparedness, communication, and response efficiency during chemical spills or other hazardous incidents. Enhancing regional collaboration strengthens response capabilities and reduces potential impacts of a wide range of hazards.  | Hazardous materials release   | High     | Staff time | General Budgets of each Jurisdiction   | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor                           | 2030       |
| DD | <b>All jurisdictions will develop backup systems and implement enhanced cybersecurity measures to protect critical data and infrastructure.</b> This includes routine data backups, network monitoring, employee training, and protocols to quickly recover systems in the event of a breach. This action will strengthen cyber defenses and reduce the likelihood of operational disruptions while also enhancing the community's resilience against evolving digital threats.   | Cyber-attacks   | Moderate | Moderate   | Homeland Security Grant Program (DHS)  | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor                           | 2030       |

| ID          | Action   | Hazard(s)             | Priority | Cost       | Funding Mechanism   | Lead Party  | Time Frame |
|-------------|--|-----------------------|----------|------------|---|---|------------|
| EE          | <b>All jurisdictions will harden electrical components and systems for critical facilities, particularly emergency response services, by implementing protective measures such as EMP shielding and surge protection.</b> These upgrades will reduce the likelihood of equipment failure and maintain operational continuity during solar storms or other space weather events. Strengthening infrastructure in this way enhances community resilience and ensures critical services remain functional under extreme conditions.                                 | Space weather hazards | Low      | High       | Hazard Mitigation Grant Program (FEMA)<br>Grid Resilience and Innovation Partnerships Program (DOE)   | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor | 2030       |
| FF<br>(new) | <b>All jurisdictions will contribute to the establishment and training of a regional crowd control unit equipped with appropriate tools, procedures, and de-escalation strategies.</b> Regular training will strengthen coordination among participating agencies and ensure readiness for large events or potential unrest. Building this capability enhances public safety and improves the region's ability to manage civil disturbances effectively.   | Civil disturbance     | High     | Staff time | Homeland Security Grant Program (DHS)<br>Emergency Management Performance Grant (FEMA)<br>General Budgets of each Jurisdiction              | Belfield Police Department, Dickinson Police Department, North Dakota State Highway Patrol, South Heart Police Department, Stark County Sheriff's Department*                               | 2027       |
| GG<br>(new) | <b>All jurisdictions will provide annual public education relating to radon risk and encourage households and business to perform radon testing and mitigation.</b> Outreach may include signage at key destinations, materials at community centers and/or city halls, and information shared through county and city websites and social media. Increasing awareness among residents will strengthen overall preparedness and help ensure proactive  | Geologic hazard       | Moderate | Staff time | Stark County General Budget<br>State and Tribal Indoor Radon Grant (EPA)  | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor | Annually   |
| HH<br>(new) | <b>All jurisdictions will collaborate with one another to develop and implement a comprehensive drought resilience and water conservation program.</b> This will include identifying vulnerable water supply systems, promoting water conservation practices, encouraging drought-resilient agricultural techniques, and supporting the development of local drought contingency plans. The jurisdictions will strive to expand education and outreach efforts to inform residents and farmers / ranchers about drought risks and water conservation strategies. | Drought               | Moderate | Moderate   | Environmental Quality Incentives Program (USDA)<br>Regional Conservation Partnership Program (USDA)<br>General Budgets of each Jurisdiction | Stark County Emergency Manager*, Belfield City Auditor, Dickinson City Administrator, Gladstone City Auditor, Richardton City Commission, South Heart City Council, and Taylor City Auditor | Annually   |

\*Lead for Mitigation Action

## Internal Communication System (A)

Interagency communication is essential during a hazardous event. Stark County will continue to update and enhance communication systems as technology improves.

## Emergency Alert Systems (B)

Prompt alerts to significant emergencies are critical to saving lives and protecting property. The County should build on existing emergency messaging systems to improve their utility and effectiveness.

## Emergency Training Exercises (C)

Table top training has been demonstrated to be an effective low-cost way to train for many emergency events. Training exercises can be coordinated with other jurisdictions to balance responsibilities and create a broader impact.

## Public Outreach and Education (D)

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

- Hazardous materials awareness/shelter-in-place for residents
- Summer and winter weather safety
- Weather resistant building best practices
- Flood safety and NFIP promotion
- Fire weather notifications and fire prevention best practices
- Water conservation techniques
- Security measures against cyber attacks
- Hardening electrical and electronic systems
- Infectious disease and pest control
- Dam/levee failures
- Use of all-hazard radios

- ND Vision Zero programs
- Travel emergency preparedness
- Drought

## SW Health Coordination (E)

Southwest District Health has detailed emergency operational plans for health hazards including the outbreak of infectious disease. It is essential that each local governing body and relevant organizations coordinate in keeping these plans up to date and training for a potential health risk.

## First Responder Training and Equipment (F)

The responders closest to the scene of a criminal terrorist nation attack or a transportation incident (especially those involving hazardous materials) may not be those typically equipped to handle these incidents. Joint training exercises can increase the level of readiness that allows a more effective and timely response. Together with increased equipment availability this can potentially limit the level of property loss or injury or loss of life from such incidents.

## Snow Fences and Shelterbelts (G)

As an ongoing policy, the Stark County Road Department encourages properly placed snow fences and shelterbelts to substantially reduce the location and frequency of snow blocked roads.

## Agricultural BMPs (H)

Because farmers and ranchers are “only two weeks away from a drought” they commonly do implement water and soil conservation practices to manage risk from drought. The County Extension and Farm Service Agencies provide close support to best practices relevant to each county.

## **Crop Insurance Programs (I)**

Risk management in the current farming and ranching industry has many facets. Crop insurance is one of the tools to address risk from significant droughts, pest infestations, hail, and flooding. Some federal agricultural support programs require crop insurance of participants.

## **Heart River Erosion Mitigation (J)**

Erosion along the Heart River has caused property damage in Belfield. The City should continue working to stabilize slopes to prevent further damage. A dedicated fund is available for these efforts.

## **Dickinson Railroad Underpass (K)**

The railroad underpass at South Main in downtown Dickinson is frequently impassible during major rain events. This significantly limits emergency response access to the other side of the railroad. Previous studies have indicated the solution is to make major changes to the existing downtown drainage system.

## **Dickinson Dam EAP (L)**

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

## **Dickinson Emergency Access Routes (M)**

There are a very limited number of points where traffic and emergency responders can travel north and south across the railroad tracks and I-94. Response times are already affected during peak hour traffic. If a major incident closes one of these access points, the

impact increases significantly. Additional access points should be identified and plans established to construct these crossings.

## **Richardton Water Supply (N)**

A need has been identified for an upgraded water reservoir for the City of Richardton. Funding is a current constraint to the design and construction of this critical facility improvement.

## **South Heart Drainageway Improvements (O)**

An area in the vicinity of 4th Avenue and the railroad tracks does not drain well due to an undersized culvert and an obstructed channel. Viable improvements should be identified and completed as feasible.

## **Hazardous Materials Transport Routes (P)**

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

## **Drone Capabilities (Q)**

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

## **NFIP Workshop (R)**

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

## **Floodplain Management (S)**

The Stark County Flood Insurance Study has information on areas at risk of flooding. This information should be incorporated into local development review processes. It is also an optimum time to review existing floodplain management procedures to enhance flood risk reduction capabilities. Additionally, the Risk MAP project has identified certain areas that may be at risk while not being within the FIRM study area.

## **Warning Sirens (T)**

Each city and responsible entity for outdoor gathering and recreation areas should assess need for outdoor warning sirens, and work with Stark County Emergency Management to address these needs. Additional study is needed to identify and prioritize locations for siren installation or upgrades. Sound mapping techniques can be used to visualize the audio footprint of each siren.

## **Storm Shelters (U)**

High winds, hailstorms and tornadoes can overturn or damage mobile homes and RVs and cause personal injury. Properly designed structures on permanent foundations are preferred alternatives. Mobile home parks and campgrounds are sites especially at risk. Further study is needed to identify and prioritize preferred locations for prefabricated shelters and existing structures that could serve as shelters. Additional efforts are needed to inform the public about shelter locations.

## **Winter Shelters (V)**

Most North Dakota residents are prepared for severe winter weather – a common occurrence – and have the mentality to ride out the storm on their own. However, some people may need assistance, and

in the event of a large-scale power outage, there should be a plan to utilize a community sheltering location such as a school or church for a day or more.

## **Urban and Wildfire Response (W)**

Urban and wildland fires and hazardous materials releases have the potential to impact a large share of Stark County population. It is essential to maintain equipment, staffing levels, and mutual aid programs.

## **Burn Restriction (X)**

Wildland fires and urban fires can be minimized by limiting open burning during seasons of high outdoor fire risk. Establishing and enforcing a burn ban can be an effective tool to reduce risk to life and property.

## **Firewise (Y)**

Firewise is a nationwide program produced by the National Fire Protection Association. Within North Dakota the program is operated by the state Forest Service. Firewise focuses on education for individual homeowners to help prepare homes for wildfire resistance.

Each jurisdiction's role within this program is to educate residents about wildfire risks and mitigation activities they can do to reduce their individual risk.

In addition to public education, the county and each city should evaluate opportunities for fuel reduction activities during wildfire season. Additional resources may be required to implement fuel reduction activities. Wildfire fuels reduction is eligible for funding through the FEMA HMGP and PDM grant programs.

## Surge Protection (Z)

Lightning strikes can cause significant damage to essential equipment and data. Surge protection is beneficial for any facility where a loss of power or equipment failure would hinder critical functions or public safety. This could apply to healthcare facilities, emergency services, water and waste treatment plants, industrial facilities, government buildings, and other uses.

## Road and Bridge Improvements (AA)

Past flood events resulted in extensive damage to roads and bridges in rural Stark County. Many roads could be at risk from flooding that disrupts transportation and damages infrastructure. Potential improvements include replacing aging and undersized culverts, elevating commonly flood impacted roads and bridges, and making other physical improvements to minimize flooding impacts on the road network and nearby property. Routine inspection and maintenance are crucial for preventing washouts and structural failure. Taking these preventative measures can save money and eliminate transportation disruptions. Localized flood mitigation projects are eligible for FEMA funds through the HMGP, PDM and FMA grant programs.

## Hazardous Material Buffers (BB)

While new development areas are not anticipated, existing subdivisions and developed areas are susceptible to health and safety risks from hazardous materials releases. Local governments should use their zoning authority to ensure that future industrial development does not encroach on incompatible uses. Although local governments do not control the siting of oil and gas facilities in North Dakota, they can use zoning to discourage dwellings and other

incompatible uses from encroaching on those sites. This action item does not apply to Taylor, which does have a zoning ordinance.

## Hazardous Materials Response (CC)

There are several major hazardous materials sites and routes throughout Stark County, particularly within and around Dickinson and Belfield. of Dickinson including refineries, a water plant with chlorine gas usage, oil pipelines, anhydrous ammonia storage facilities, rail transshipment facilities, and multiple manufacturing or other industrial businesses that use hazardous materials. Collectively, these locations present a risk of hazardous materials release, which threaten public health and safety. During a hazardous materials incident, the First Responders may not be familiar with how to handle the hazardous material. Increasing training and resources for regional response teams would help mitigate risks.

## Cybersecurity (DD)

Cyber-attacks can cause costly impacts for local governments, schools, and other critical facilities. Strategies and solutions include multifactor authentication, security awareness training (e.g., fake phishing emails), and migrating to cloud-based storage. Agencies and organizations can also conduct simulated cyber-attacks to test the effectiveness of their cyber security system.

## EMP Shields (EE)

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

## Crowd Control (FF)

Crowd control units work to prevent civil disturbances and restore peace and order in the event of a disturbance. Officers should be

properly trained in de-escalation tactics, crowd dynamics, and the appropriate use of force.

### **Radon Mitigation (GG)**

Radon is a widespread hazard in North Dakota and can cause long-term health impacts, including lung cancer. The entire state is within the EPA's Zone 1, meaning there is a high probability of radon being found in the soil. There are several mitigation strategies for radon exposure in households. Prior to mitigation, however, the lower levels of structures must be tested with simple Radon Test kits that can be acquired at local hardware stores or a variety of suppliers.

### **Drought Resilience and Water Conservation Program (HH)**

Drought poses a significant threat to rural jurisdictions due to their heavy reliance on agriculture and limited water supply infrastructure. Prolonged periods of below-average precipitation can reduce soil moisture, leading to crop losses, reduced livestock productivity, and financial hardship for agricultural producers, which in turn affects the broader local economy. Strengthening regional coordination and promoting proactive drought planning will reduce the severity of economic, environmental, and public health impacts associated with drought, particularly in communities currently lacking drought-specific mitigation actions.

A black and white photograph of a group of people, likely firefighters, sitting at several tables in a large, open garage. They are engaged in conversation and some are eating. In the background, a fire truck is parked, with the text "WEST DUNK FIRE DIST. DUNK CENTER, N.D." visible on its side. The scene is lit by overhead fluorescent lights, and the overall atmosphere is one of a community gathering.

# PLAN MAINTENANCE

## Introduction

This chapter details the plan maintenance process to make sure the Multi-Hazard Mitigation Plan for Billings, Dunn, Golden Valley, and Stark Counties will remain an active and relevant document. The MHMP maintenance process includes monitoring the implementation of mitigation projects, evaluating the effectiveness of the plan at achieving its goals, and updating the Plan.

## Plan Monitoring and Evaluation

**Appendix E** includes mitigation action progress report forms to aid in Plan monitoring and evaluation. Each county's Emergency Manager will alert the Local Emergency Planning Committee (LEPC) for each county and issue and collect progress forms to/from the Local Emergency Planning Committee (LEPC) and review the forms at an LEPC meeting once per year. A basic agenda for each LEPC meeting should include:

- Discussion of project progress for the current period (and uncompleted projects from previous periods)
- Local champion reports on project status
- Discussion of upcoming projects and grant/funding opportunities
- Develop action list for upcoming reporting period

The party responsible should provide the following basic information about projects in the reporting period:

- What was accomplished for the project since the last meeting
- What obstacles, problems or delays did the project encounter
- If the project needs to be changed or revised

- Evaluation of project effectiveness (did the project meet its goal)

A progress report form should be completed for each project during the reporting period (and projects from previous reporting periods that have not been completed). If time constraints are an issue, the LEPC may decide to only complete the form for high priority projects; lower-priority projects may be generally discussed without completing the form.

Each County's Emergency Manager should maintain a folder with all Mitigation Action Progress Report Forms and meeting notes. The risk and vulnerability assessment should be evaluated during an LEPC meeting approximately two years after plan adoption. Any changes to risks since plan adoption, such as a major flood event that damaged areas thought to be safe from flooding, should be noted. If there are new additions or changes to critical facilities in each County, a report detailing these changes should be made. If significant changes are required, the Emergency Manager should schedule a meeting to discuss amending the current plan. If no significant changes are required, the Emergency Manager should save the report of changes for reference during the next five-year plan update.

LEPC meetings that are reserved for discussion of the plan should be open to the public and advertised. Since weather and infectious disease impacts have been so significant in the area in recent years, there may be public interest in ongoing efforts to reduce hazard impacts. A simple Annual Emergency Management Status Report may be a reasonable product of the LEPC monitoring and evaluation process. The report could be posted on each county's website and relevant social media platforms. A copy of the Report could be sent to each local newspaper serving the area.



Although Emergency Management staff time is already stretched meeting existing workload requirements, a part of the ongoing outreach effort could include distribution of infographic style posters that would remind and educate county citizens about key hazards and mitigation opportunities.

## ADDITIONAL EVALUATION METHODS

The LEPC meetings and progress report forms are the primary mechanisms for monitoring implementation. However, other tools will be considered to gauge this Plan's effectiveness. Surveys/polls are one example. The MHMP update included a community survey and mini-polls that were conducted at the public workshops. These tools provide a baseline for understanding how the public perceives hazard risks and vulnerabilities. Within three to four years of adoption, the County emergency managers will distribute follow-up surveys/polls to provide a point of comparison. This will help each county understand if public perceptions or priorities are changing in response to changing hazard risks or completed mitigation actions. Survey feedback will also provide a starting point for the next MHMP update.

When a hazard event occurs, this provides another opportunity to evaluate plan effectiveness. As part of the damage assessment, the impacted county(ies) will complete a loss avoidance study. Loss avoidance studies are a great way to promote the value of mitigation planning to the community and can provide powerful justification for future mitigation projects. The loss avoidance study will examine the losses that occurred following the implementation of a mitigation action versus what would have occurred if the implementation action had not been implemented. Counties can partner with DES to complete a technical evaluation using FEMA's Hazus software or a similar tool.

## Integration into Existing Planning Mechanisms

### PRIOR INTEGRATION

The 2020 MHMP was integrated into each county's Local Emergency Operations Plan (LEOP). Hazard risks and mitigation priorities were integrated in Stark County's Comprehensive Plan, which includes an element for Emergency Management. This plan also integrated the county's updated FIRMs and Flood Insurance Study, which were adopted in 2024. The Medora Area Plan, which includes Billings County, also identifies hazard risks and mitigation strategies. The future land use map that guides development in Medora and the surrounding region accounts for flood risks. Direction 2050, the comprehensive plan for the City of Dickinson, is currently being drafted, and is exploring the development of a flood protection plan for the lowest-lying areas of the city near the Heart River to ensure residents and the City understand potential risks. The 2020 MHMP was not integrated into any planning mechanisms for smaller communities such as Dodge, Dunn Center, Halliday, Killdeer, Beach, Golva, Sentinel Butte, Belfield, Gladstone, Richardton, South Heart, or Taylor.

### FUTURE INTEGRATION

The limited resources of each jurisdiction do not allow for many activities beyond the standard course of business, and mitigation can get overlooked. It is the role of each responsible party identified in Chapter 4 to be present at annual budget meetings and advocate for consideration of mitigation projects. As noted in Chapter 4, some jurisdictions lack zoning controls and comprehensive plans.

Establishing zoning and completing a comprehensive plan could help ensure that some of the mitigation action items are more effectively implemented. For jurisdictions that have adopted a comprehensive plan, the MHMP can be integrated during plan review/future updates. Like the MHMP, each comprehensive plan is a living document and should be reviewed on an annual basis. When each city or county reviews/updates their comprehensive plan, they will consider how to integrate the mitigation strategies from the MHMP.

Some specific integration mechanisms that will aid implementation of the MHMP are the following:

- Each county will incorporate their mitigation strategies into their Local Emergency Operations Plan (LEOP).
- Cities without zoning ordinances (Belfield, Richardton, Taylor) could establish a specific policy discouraging development in areas identified as susceptible to flooding. In addition, Belfield will discourage development in areas susceptible to erosion.
- Cities and counties with zoning (Beach, Dickinson, Dodge, Dunn Center, Gladstone, Golva, Halliday, Killdeer, Medora, Sentinel Butte, South Heart, and all four counties) could develop an overlay zone to address areas with special building limitations or concerns such as areas susceptible to flooding dam failure inundation landslides, wildfire risk, or hazardous materials release. The risk assessment includes several maps that show locations with higher risks of flooding, fire, landslides, and other hazards. These maps can be incorporated by reference into each jurisdiction's zoning standards. For example, jurisdictions could require a higher level of review for development in high-risk areas.
- Cities and counties with zoning (see above) could adopt or increase setbacks from hazardous materials transport routes,

pipelines, or other sites at a higher risk of hazardous materials release. In addition, they could adopt or amend special use standards for industrial sites that present hazard risks.

- All cities and counties could incorporate pipeline operators in the development review process. This would help planning staff understand precautionary needs, such as evacuation procedures for specific materials. In addition, jurisdictions could implement a "consultation zone" for areas with high pipeline density. This recommendation from Stark County's Comprehensive Plan would require property owners or developers to consult with pipeline operators when submitting applications for building permits or development approval (i.e., zone change or subdivision plat).
- Cities and counties without comprehensive plans (Beach, Belfield, Dodge, Golva, Gladstone, Halliday, Richardton, Sentinel Butte, South Heart, and Taylor) could adopt comprehensive plans. North Dakota Century Code requires a comprehensive plan to provide legal support for zoning. While these communities have limited resources to complete a plan, they are encouraged to adopt a future land use map and identify their short- and long-term infrastructure needs. The mitigation strategy for Dodge includes adoption of a comprehensive plan.
- Cities and counties with comprehensive plans (Dickinson, Dunn Center, Killdeer, Medora, and all four counties) will review their comprehensive plans on an annual basis and determine if updates are needed to align the plans with the MHMP. Dunn Center's Comprehensive Plan was adopted in 2011 and Killdeer's Plan was adopted in 2019. These plans may be due for updates. Dickinson, Stark County, and Billings

County adopted their comprehensive plans within the past three years. A comprehensive plan update is included in the mitigation strategy for Killdeer.

- Cities without an adopted building code (Belfield, Dodge, Dunn Center, Golva, Gladstone, Halliday, Sentinel Butte, Taylor) could consider adopting the state building code and specifically adding snow load standards to reduce risk of structural collapse.
- Cities and counties will incorporate mitigation projects into their Capital Improvement Plans (CIP). In addition to projects that are funded locally, this might include projects utilizing discretionary funding that require a local match. Example infrastructure projects identified in the MHMP include roadway improvements in Medora (Chateau access), a dynamic messaging sign in Beach, snow fences, and storm shelters.

The MHMP provides a foundation for community engagement. It is important to continue to engage the community to maintain interest in mitigation. Two ways to help maintain interest are:

- Develop a kiosk or small display with posters and materials for distribution to inform county residents about opportunities and methods to increase resilience. Situate the kiosk at periodic public events such as fairs, community days, etc.

- Periodically provide a news release, blog, or short article for local newspapers on some aspect of emergency management such as tips for keeping your home safe from wildland fires. Actively promote mitigation efforts on city and county websites and social media platforms.

## Updating the Plan

Each County Emergency Manager is responsible for overseeing the five-year update process. Twelve to fourteen months should be allowed for completion of the plan – nine to eleven months to develop a draft and three months to collect DES and FEMA comments/revisions and formally adopt the plan. Emergency managers should begin the plan update process approximately fifteen months prior to the expiration of the current plan. The first step is to develop the project scope by utilizing the Plan Update Evaluation Worksheet in **Appendix E**. Funding opportunities from DES/FEMA may also be evaluated when determining project scope.

Emergency managers should maintain any documentation gathered during the five-year period that will be useful when developing the update. This will help to greatly reduce the research collection phase of the plan update, which will reduce the time and cost of the plan update. It will also ensure that any priority items identified during LEPC monitoring meetings will be included in the plan.