

1.0 INTRODUCTION

The effects from natural and man-made hazards directly impact the safety and well being of Cavalier County residents. Historically, Cavalier County residents have dealt with floods, high winds, severe summer storms with damaging thunderstorms producing hail and tornadoes, harsh winter storms with extreme cold and blizzards, wildfires, drought, and hazardous material spills. While most hazards cannot be eliminated, the effects from them can be mitigated. Cavalier County, working in conjunction with North Dakota Department of Emergency Services and the Federal Emergency Management Agency (FEMA), and Nick of Time prepared this Multi-Hazard Mitigation Plan (MHMP) (the plan) to help guide and focus hazard mitigation activities. The Cavalier County Multi-Hazard Mitigation Plan profiles significant hazards to the community and identifies mitigation projects that can reduce their impacts. The purpose of the plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural and manmade hazards. The Cavalier County Multi-Hazard Mitigation Plan includes resources and information to assist Cavalier County residents, organizations, local government, and others interested in participating in planning for natural and man-made hazards. The mitigation plan provides a list of mitigation projects that will assist Cavalier County in reducing risk and preventing loss from future hazard events.

1.1 AUTHORITY

The Disaster Mitigation Act (DMA) of 2000 amends the Robert T. Stafford Disaster relief and emergency assistance act by adding a new section, 322 – Mitigation Planning. It requires all local governments to have an approved Multi-Hazard Mitigation Plan in place by November 1, 2004 to be eligible to receive Hazard Mitigation Grant Program project funding.

The following government jurisdictions have adopted this plan by the official method of approval based upon their legal authority. Organizations within Cavalier County that are eligible for future Hazard Mitigation Grant Programs or Pre Disaster Mitigation Grant Programs have participated in the planning process or have been sponsored by an organization that has done so. Currently, Cavalier County is submitting as a multiple jurisdiction. Proof of adoption will be kept under corresponding jurisdiction's records management program. Cavalier County will provide up to date resolutions pending the approval of the MHMP by ND DES and FEMA Region VIII. Previous adoptions are attached for review.

Participating Jurisdiction	Date of Adoption
City of Alsen	
City of Calio	
Cavalier County	
City of Calvin	
City of Hannah	
City of Langdon	
City of Loma	
City of Milton	
City of Munich	
City of Nekoma	
City of Osnabrock	
City of Sarles	
City of Wales	

Cavalier County Emergency Manager will be responsible for submitting the adopted plan to the State

Hazard Mitigation Office in Bismarck, North Dakota. The State Hazard Mitigation Officer will then submit the plan to the Federal Emergency Management Agency (FEMA) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, Cavalier County and the other plan signatories will gain eligibility for local mitigation project grants, pre-disaster mitigation (PDM) and post-disaster hazard mitigation grant projects (HMGP).

1.2 ACKNOWLEDGEMENTS

Many groups and individuals have contributed to development of Cavalier County Multi-Hazard Mitigation Plan. The local Emergency Manager, DES Local Programs Coordinator, North Dakota State Hazard Mitigation Officer, and Nick of Time provided significant guidance and support to all aspects of plan development. The National Weather Service provided historic newspaper accounts of severe weather events and other weather data. Numerous elected officials, city and Cavalier County personnel, and the local communities participated in the planning process and contributed significantly to the plan's development. This plan was also partially funded through the 2002 Pre-Disaster Mitigation Grant. The following agencies and government jurisdictions have participated in the development of this plan, its contents, the mitigation projects, and their involvement. See Attachment II for list of participants.

Cavalier County Emergency Management
City of Alsen, Calio, Calvin, Hannah, Langdon, Loma, Milton, Munich
Mayors' Office

Auditors' Office

Council Members

Cavalier County

911 Coordinator

Sheriff's Office

Auditor's Office

Roads Department

Treasurer's Office

Cavalier County Commissioners

Cavalier County Health Nurse

Social Service Director

Cavalier County Highway Superintendent

Cavalier County Sheriff

Tax Assessors

Cavalier County Extension Service

Langdon City and Rural Fire Departments

District Environmental Health Officer

Cavalier County Memorial Hospital Administrator

Functional Coordinators of the Local Emergency Operations Plan (LEOP), Members include:
Cavalier County Commission Chairman, Devils Lake Mayor, Devils Lake & Cavalier County Auditors,

Devi's Lake & Ramsey Cavalier County Tax Assessors, Cavalier County Health Nurse, Social Services Director, Devils Lake Fire Chief, Cavalier County Sheriff, Devils Lake Police Chief, and Cavalier County Highway Superintendent.

Committee Members of the Local Emergency Planning Committee (LEPC), Members include: Cavalier County Emergency Manager, District Environmental Health Officer, Cavalier County Highway Superintendent, Devils Lake City & Rural Fire Chiefs, Devils Lake Police Chief, 911 Coordinator, Law Enforcement Center Administrator, Mercy Hospital Administrator & Risk Manager, Devils Lake City Engineer, District Highway Patrol Captain, Members of the Media, Cavalier County Sheriff, A Cavalier County Commissioner and Cavalier County Extension Agent.

1.3 PROJECT AREA LOCATION

Cavalier County is located in the northeast portion of North Dakota. Cavalier County is 1,488 square miles making it the 19th largest county in the state. It is 31 miles from north to south and 48 miles from east to west. Cavalier County is bounded by Manitoba, Canada to the north, Towner County to the west, Pembina County to the east and Ramsey and Walsh Counties to the south. Langdon is Cavalier county seat and incorporated towns include Langdon, Munich, Osnabrock, Milton, Alsen, Sarles, Nekoma, Hannah, Wales, Calio, Calvin, and Loma. The Pembina, Little South Pembina Rivers, the Tongue River and branches of the Park River are included in the area. **Table 1-1** presents a location map of the Plan area.

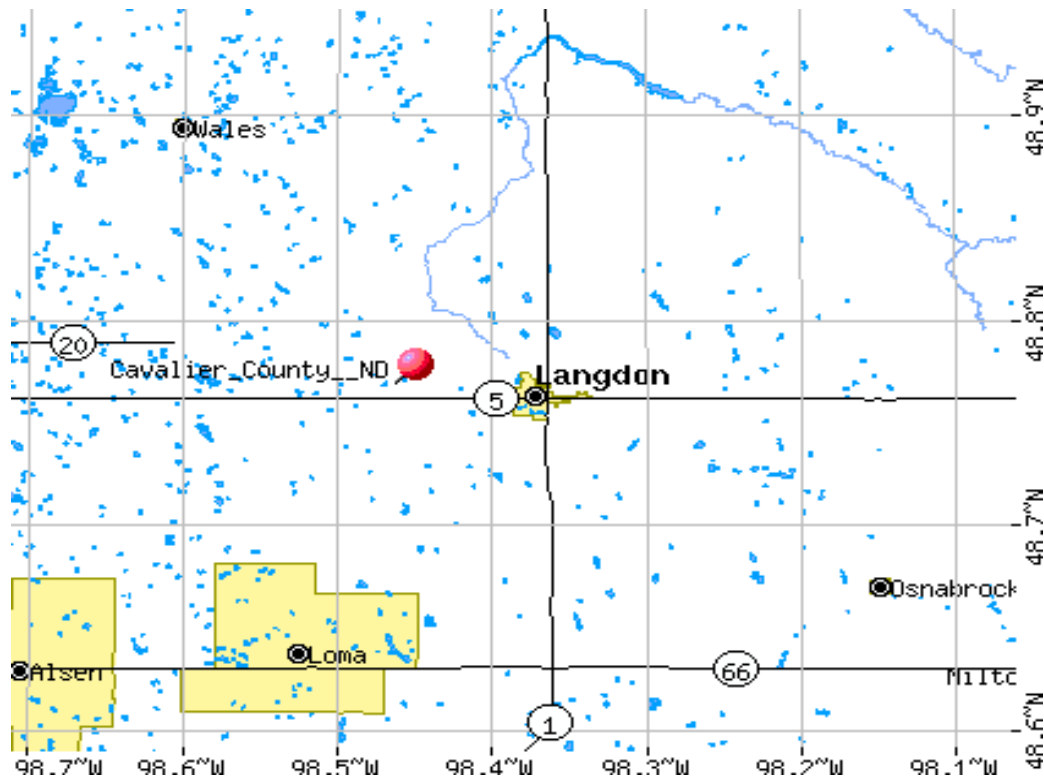


Table 1-1 Plan Area

Elevation in Cavalier County ranges from about 940 feet above mean sea level (amsl) along the Pembina River at the Pembina/ Cavalier County line, to nearly 1,680 feet 3 miles northeast of Nekoma. The high and low spots in Cavalier County are within five miles of each other. Most of Cavalier County consists of upland glaciated plains. The plains are level sloping. The eastern portion of Cavalier County the terrain turns to gently sloping hills and forest regions. There is significant loose soil and deep topsoil.

According to the 2000 census, the population of Cavalier County is 4,831. This represents a 7.2% decline in population in the 10 years since the last census. In the last three years the population has continued to decline to 4,484 as of 2003 estimate. The median age in Cavalier County is 45.2 years old (U.S. Bureau of the Census, 2001 in DO1, 2002).

Table 1-2			
Communities in Project Area			
<i>Town</i>	<i>Population</i>	<i>Town</i>	<i>Population</i>
<i>Langdon</i>	<i>1,934</i>	<i>Nekoma</i>	<i>47</i>
<i>Munich</i>	<i>246</i>	<i>Hannah</i>	<i>19</i>
<i>Osnabrock</i>	<i>165</i>	<i>Wales</i>	<i>28</i>
<i>Milton</i>	<i>79</i>	<i>Calio</i>	<i>22</i>
<i>Alsen</i>	<i>64</i>	<i>Calvin</i>	<i>24</i>
<i>Sarles</i>	<i>24</i>	<i>Loma</i>	<i>19</i>

1.4 CLIMATE AND WEATHER

Cavalier County, North Dakota is located within the region generally classified as mild and dry continental or Steppe with four well-defined seasons. The weather can be quite changeable with large day to day temperature variations, particularly from the fall to the spring. Days with severe winter cold and summer heat are typical.

Normally the temperature is moderate until the beginning of July, after which short, hot periods are experienced until the end of August. The freeze-free period is the number of days between the average last occurrence of freezing temperatures in the spring and the average first occurrence of 32 degrees F or lower in the fall. The length of the freeze-free period approximates the length of the growing season which ranges from 130 days or more between May 21st and September 21st. Topography and local weather conditions can produce subfreezing temperatures at the ground surface while the air temperature a few feet above the ground remains above 32 degrees F.

Annual average precipitation is 19 inches, with over 75% of the precipitation falling from May through September. Precipitation can vary significantly from year to year, and location to location within a given year. The heaviest most intense precipitation often occurs with localized downpours associated with thunderstorms in June through August. Significant flash flooding can result from these downpours with over 3 inches of precipitation reported in a few events. Widespread heavy precipitation events of 1 to 2 inches can occur every few years and is most common from April through June and September through early November.

Average winter snowfall ranges up to 30 inches, with the highest averages over the western part of the county. The heaviest snowstorms often occur from late March through May or mid October to mid November. These storms can produce more than 12 inches of snow and are often made more severe as temperatures are warmer, and therefore the snow is heavier and more difficult to travel in and remove. These storms are often accompanied by high winds resulting in blizzard conditions. In spring these storms can coincide with the calving season resulting in livestock loss. Mid winter snowstorms in general produce less than 6 inches of snow, but heavier amounts to 19 inches or more have occurred. Despite the generally lighter amounts and drier snow, high winds can result in blizzard conditions. Even without falling snow, in the colder conditions of mid winter, high winds can pick up loose snow, resulting in local ground blizzards.

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

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

Table 1-3 details the top weather events recorded by the NWS at the Langdon weather station.

Temperature, precipitation, and snowfall tables from Langdon are representative for the more exposed central and eastern sections of the county. Night time winter temperatures are likely colder north of Langdon, and in sheltered valley locations.

<i>TABLE 1-3</i>					
<i>TOP WEATHER EVENTS RECORDED FOR CAVALIER COUNTY, NORTH DAKOTA</i>					
<i>Hottest Days</i>		<i>Coldest Days</i>		<i>Wettest Days</i>	
<i>104 Degrees</i>	<i>July 11, 1973</i>	<i>-39 degrees</i>	<i>Jan 24, 1966</i>	<i>3.5"</i>	<i>Sept 26, 1964</i>
<i>104 Degrees</i>	<i>Aug 8, 1983</i>				

For the purposes of this hazard assessment and mitigation plan, weather is of interest when it threatens property or life and thus becomes a hazard. The NWS provides short-term forecasts of hazardous weather to the public. In addition to issuing tornado and severe thunderstorm watches the NWS also produces regularly-scheduled severe weather outlooks and updates on various forms of hazardous weather including heavy rain and winter storms. NWS's warning and advisory criteria for severe weather is presented in **Table 1-4**. Descriptions of historic weather related hazard events and documentation of the frequency, severity, and impact of hazardous weather is presented in **Plan Section 3**.

TABLE 1-4 WARNING AND ADVISORY CRITERIA FOR SEVERE WEATHER		
Summer Weather Event	Criteria	
Severe Thunderstorm Warning	Any thunderstorm wind gust equal to or greater than 58 mph; any hail size $\frac{3}{4}$ inch or larger.	
Tornado Warning	A violently, rotating column of air extending from the base of a thunderstorm to the ground	
Flash Flood Warning	Flooding is imminent, water levels rise rapidly with inundation occurring in less than 6 hours.	
Flood Warning	Flooding is expected to occur more than 6 hours after the causative event.	
Winter Weather Event	Winter Weather Advisory	Winter Storm/Blizzard Warning
Snow	2-5 inches of snow in 12 hours	6 inches or more in 12 hours, or 8 inches in 24 hours.
Blizzard	(see blowing snow)	Sustained winds or frequent gust to 35 mph with visibility below a $\frac{1}{4}$ mile for three hours or more.
Blowing Snow	Visibility at or less than a $\frac{1}{2}$ mile.	Visibility at or less than $\frac{1}{2}$ mile in combination with snowfall at or greater than 6 inches and/or freezing precipitation.
Ice/Sleet	(see freezing rain/drizzle)	Accumulations of $\frac{1}{4}$ inch or more of ice.
Freezing Rain/ Drizzle	Light precipitation and ice not forming on exposed surfaces.	None

Wind Chill	Wind chills of 20 to 39 below zero with a 10 mhp wind in combination with precipitation.	Wind chills of 40 below zero or colder with a 10 mhp wind in combination with precipitation.
Summer Weather Event	Non-Precipitation Advisory	Non-Precipitation Warning
High Wind	None	Sustained winds of 40 mph for an hour or any gust to 58 mph (non-convective winds).
Heat	Heat Index of 105 or more for at least three days.	High temperature of 105. Low of 80 or more for 3 days or more.

1.5 REGIONAL ECONOMY

The major source of income and the major industry in Cavalier County is agriculture followed by construction. Unemployment rates in North Dakota have been fairly stable over the last five years at around 3.1 to 3.7%. According to the 2000 Census 9.9% of the population of Cavalier County falls below the poverty line.

1.6 SCOPE AND PLAN ORGANIZATION

The scope of Cavalier County Multi-Hazard Mitigation Plan includes the following:

- Identify and prioritize disaster events that are most probable and destructive,
- Identify critical facilities,
- Identify areas within the community that are most vulnerable,
- Develop goals for reducing the effects of a disaster event,
- Develop specific projects to be implemented for each goal,
- Develop procedures for monitoring progress and updating the plan, and
- Officially adopt the plan.

The plan is organized into sections that describe the planning process (Section 2), risk assessment (Section 3), mitigation strategies (Section 4), and plan maintenance (Section 5).