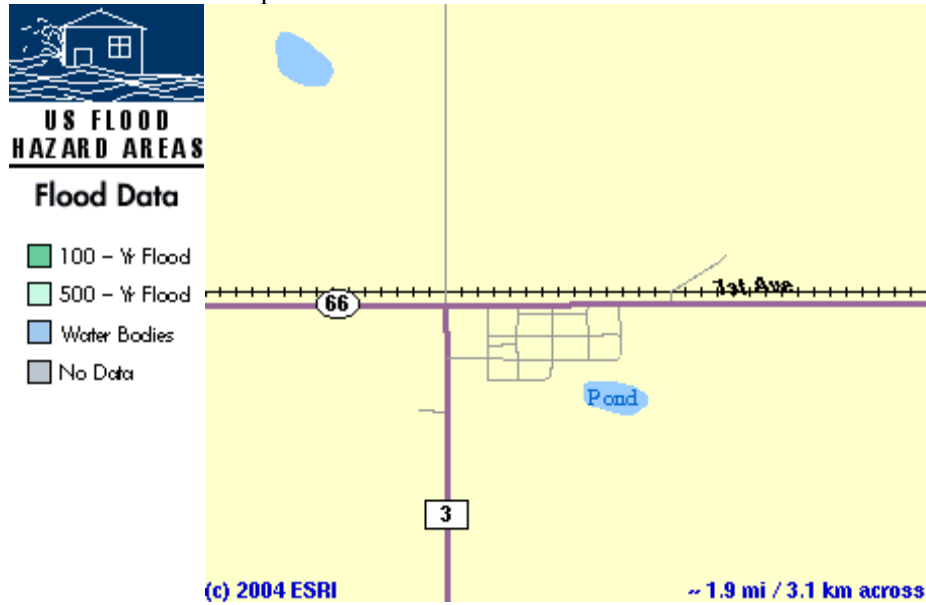


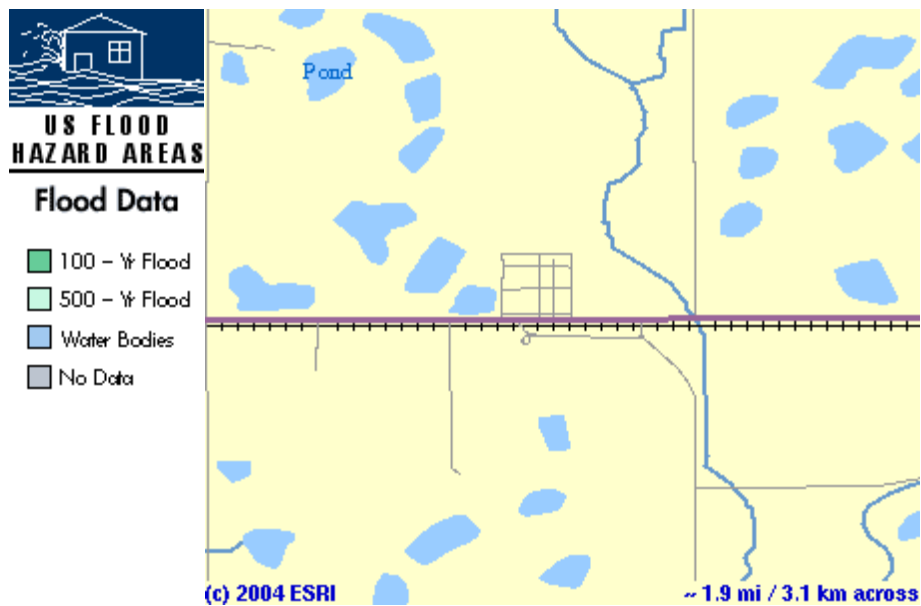
6.0 ADDITIONAL HAZARD MAPS FROM ESRI

6.1 ESRI Flood Maps

6.1.1 ESRI Flood Map of Alsen



6.1.2 ESRI Flood Map of Calio



6.1.3 ESRI Flood Map of Calvin

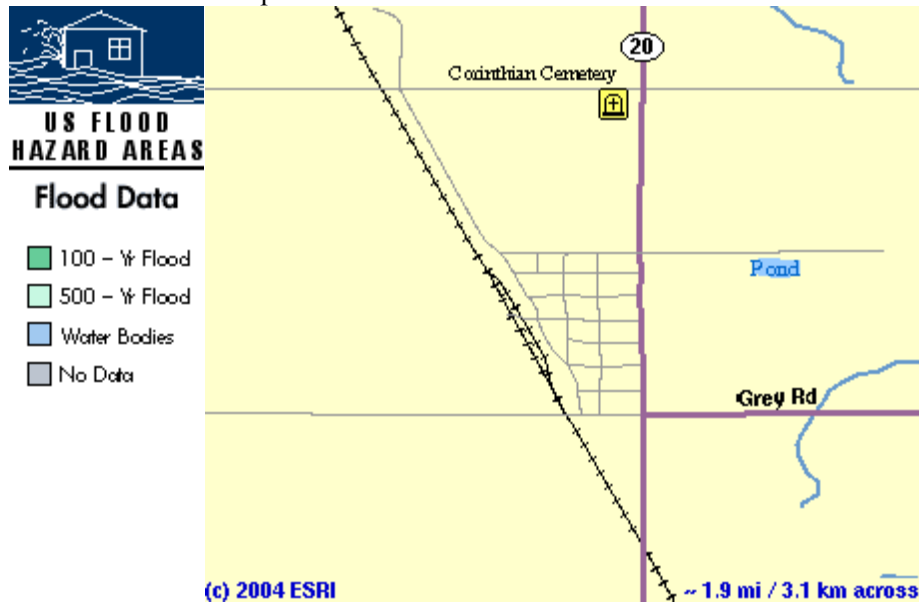


Table 6.1.4 ESRI Flood Map of Hannah

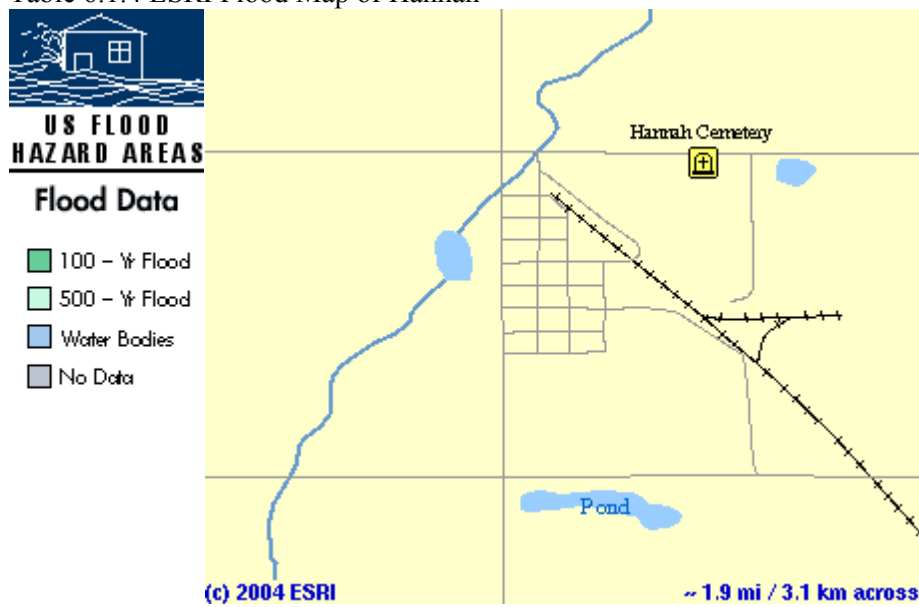


Table 6.1.5 ESRI Flood Map of Langdon

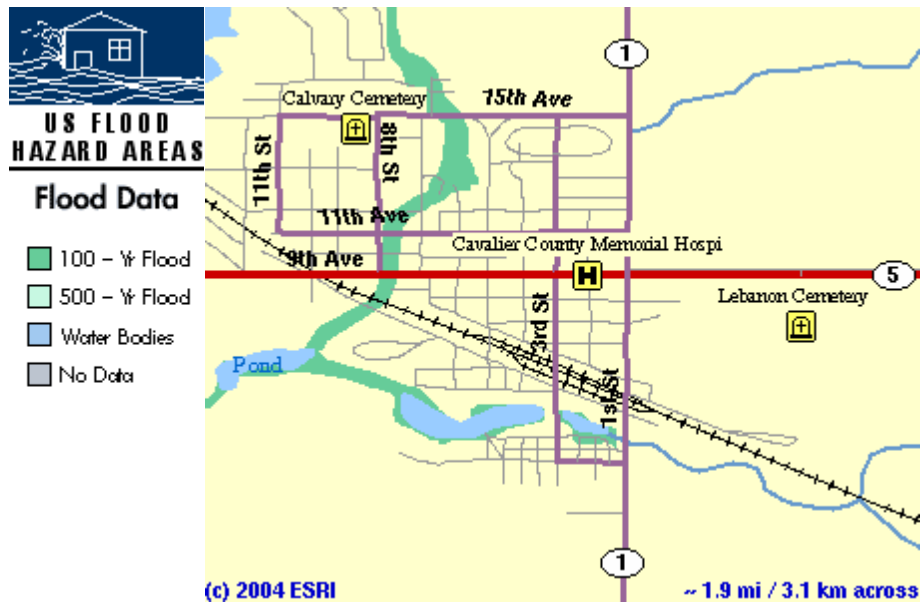


Table 6.1.6 ESRI Flood Map of Loma

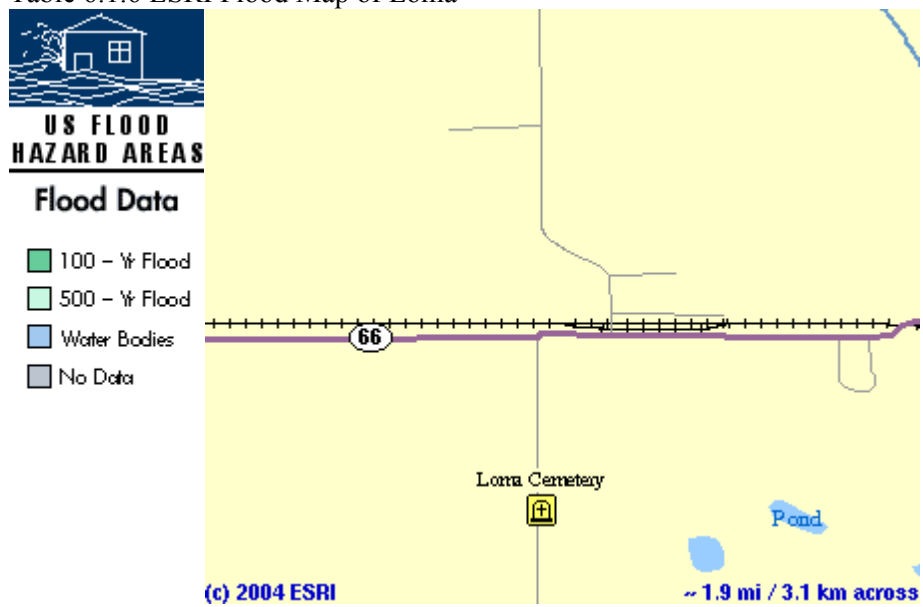


Table 6.1.7 ESRI Flood Map of Milton

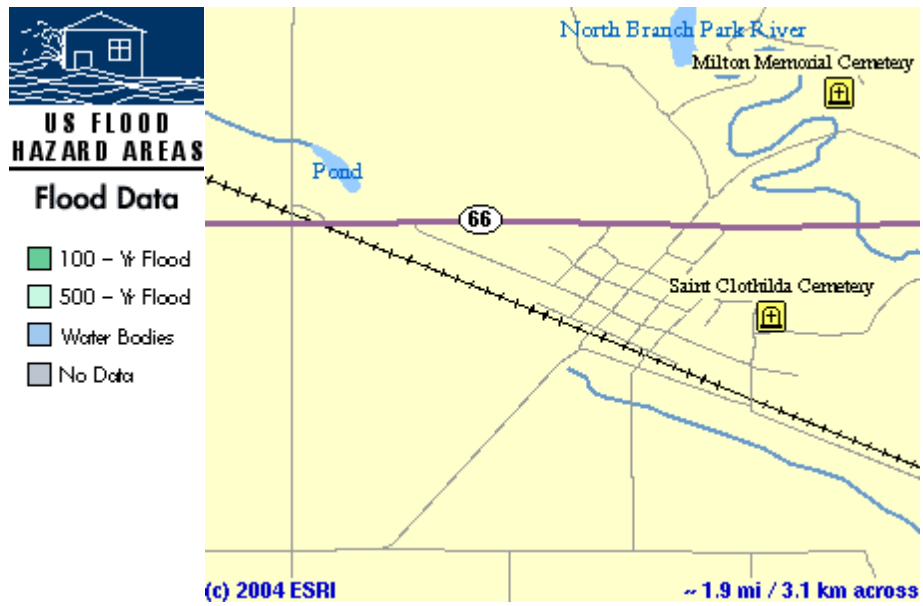
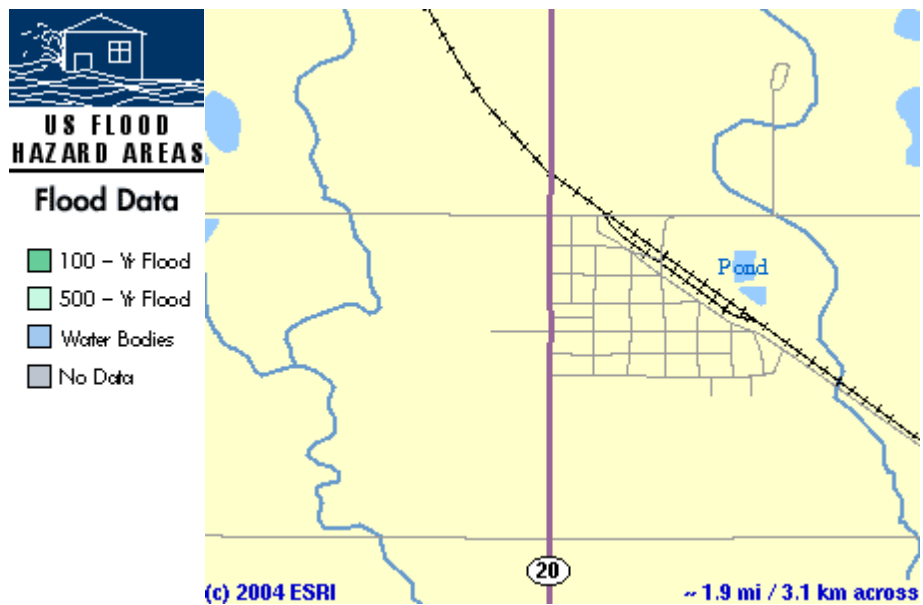
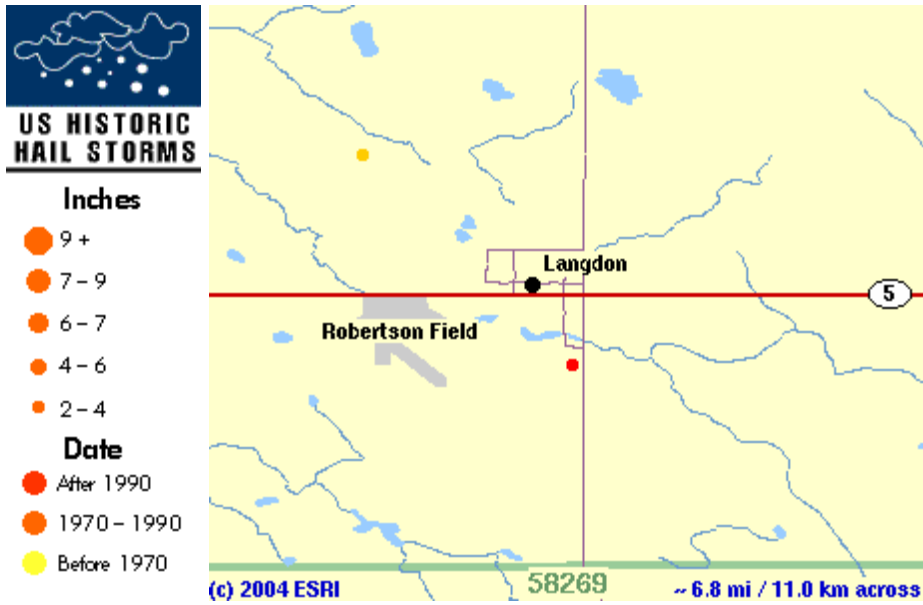


Table 6.1.8 ESRI Flood Map of Munich



6.2 HAIL MAP



6.3 HISTORIC TORNADOS

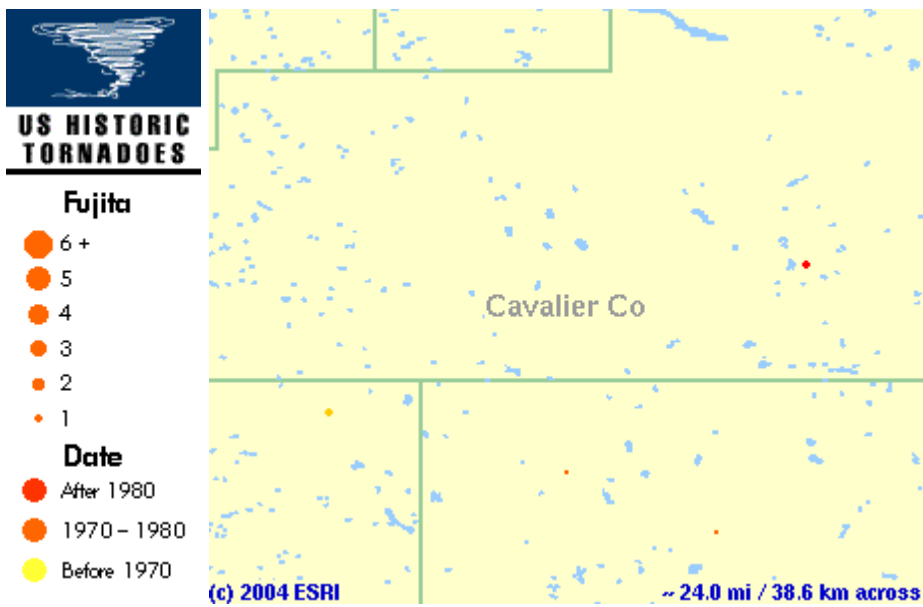
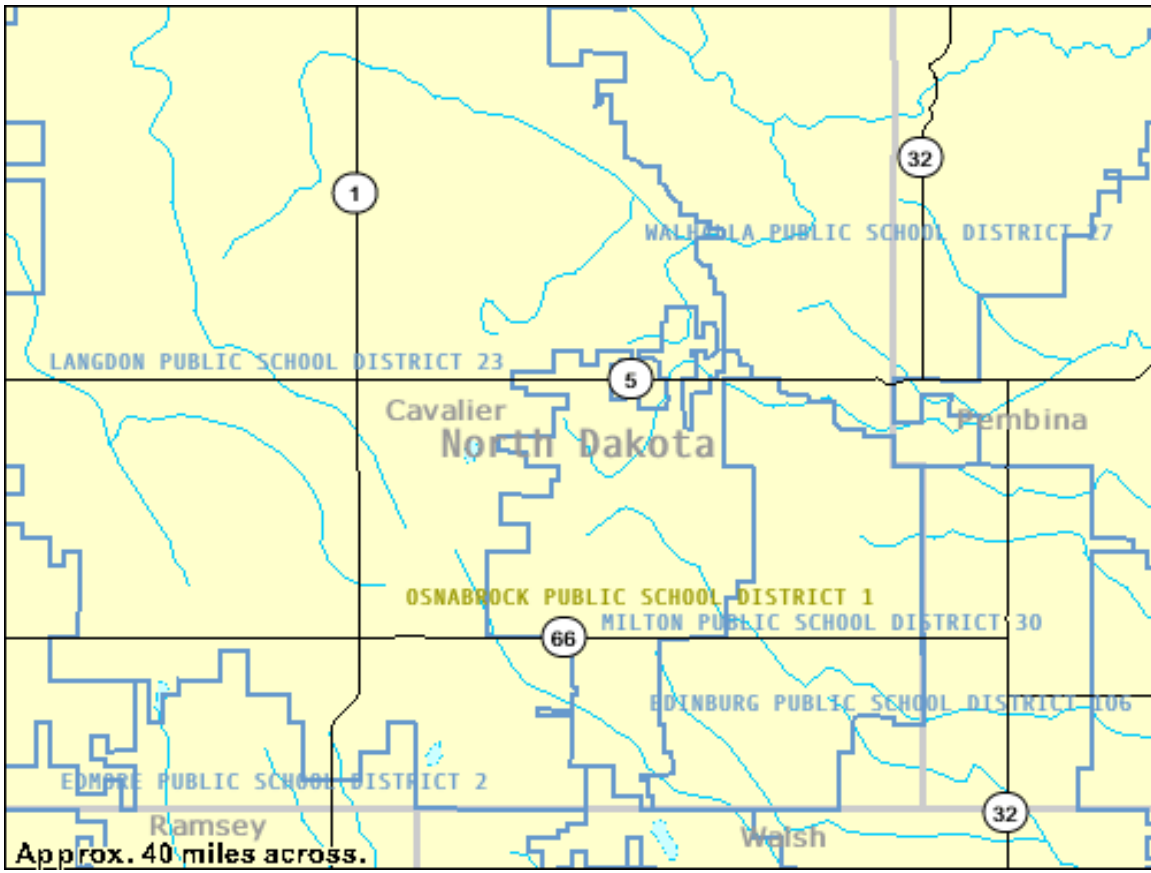


Table 6.4 Cavalier County School Districts



7.0 REFERENCES

FEMA, 1997. Multi Hazard Identification and Risk Assessment. A corner stone of the National Mitigation Strategy. Federal Emergency Management Agency.

North Dakota Department of Labor and Industry. 2001. Annual Average Labor Force Summary Report.

North Dakota State University: Loss Estimation Project. NDSU Emergency Management Program and DEM PDM Joint Project – Karlgaard/Powers, Summer 2003.

National Weather Service (NWS). Newspaper Article Collection of Historic Weather Events. Mayville State University, North Dakota.

NWS. Top Weather Events. Compiled by Greg Gust, NWS, Grand Forks, North Dakota.

NWS, 2000. Halloween 1999 Firestorms. National Weather Service Power Point Presentation.

U.S. Bureau of the Census. 2001. Profile of General Demographic Characteristics for 2000.

U.S. Bureau of the Census, 2001b. Table A98-30 (Estimated Number and Percent People of All Ages in Poverty by County: North Dakota).

ATTACHMENT I – NDSU Loss Estimation Data

Incorporated Cities:

1. Alsen
2. Calio
3. Calvin
4. Hannah

5. Langdon
6. Loma
7. Milton
8. Munich
9. Nekoma
10. Osnabrock
11. Sarles
12. Wales

Contact Information:

Katie Dietz (Emergency Manager)
901 3rd St. Suite 15
Langdon, ND 58249-0751
Work #: (701) 256-3911
EOC #: (701) 256-2555
FAX #: (701) 256-2546
Mobile #:
Email: kdietz@state.nd.us

Please look at the “Source of Information” column of the worksheet 3b for other contact information regarding sources of collected data.

Research Information:

Sources

Maps:

Aerial
www.terraserver-usa.com

Historic – Flood, Hail Storms, Tornadoes, and Wind Storms
www.esri.com/hazards/makemap.html

Road
North Dakota Official Highway Map 2003-2004

Statistics:

<http://factfinder.census.gov/servlet/BasicFactsServlet>

Other:

History in County

Floods

- March 1, 1995 – Some flooding due to rapid snowmelt and saturated soil.
- August 18, 1995 – Up to a foot of rain fell over north-central Cavalier County.
- April 10, 1996 – Flooding occurred on the Red River and spread into its tributaries.
- July 12, 1997 - Heavy rainfall in north central Cavalier county, near the town of Wales. Heavy Rainfall also occurred 2 miles south of Hannah and 12 miles west of Langdon.
- July 11, 2000 – Munich experienced flooding due to rainfall.
- June 10, 2002 – Heavy rainfall produced flooding.
- August 31, 2002 – Water over county roads.
- August 31, 2002 – Flooding occurred 6 miles northeast of Vang.

Wildfires

- Specific listings of fires in rural Cavalier County not located.

Severe Summer Storms – Tornado

- June 13, 1991 – F1 tornado reported in Cavalier County with an approximate length of 1 mile and an approximate width of 100 yards.
- June 20, 1995 – F0 tornado reported 4 miles northwest of Langdon with an approximate width 10 yards.
- August 13, 2000 - F0 tornado reported 2 miles southeast of Milton with an approximate length of 1 mile and approximate width of 50 width.

Severe Summer Storms – Hail

- August 27, 1990 – Hail reported in Cavalier County.
- June 13, 1991 – Hail reported in Cavalier County.
- August 18, 1994 – Hail reported in Langdon area.
- August 18, 1994 – Hail reported in northeast of Langdon.
- August 18, 1994 – Hail reported in Langdon area.
- August 18, 1994 – Hail reported 30 miles south of Maida
- August 27, 1995 – Hail reported in Munich area.
- June 22, 1995 – Hail reported southeast of Alexander.
- June 5, 1996 – Hail reported 15 miles west of Langdon.
- October 11, 1997 – Hail reported in Olga area.
- May 14, 1998 – Hail reported in Landon area.
- May 14, 1998 – Hail reported in Landon area.
- May 27, 1998 – Hail reported 2 miles south of Alsen.
- May 27, 1998 – Hail reported in Nekoma area.
- May 27, 1998 – Hail reported in Nekoma area.
- May 27, 1998 – Hail reported 6 miles east of Nekoma.
- May 28, 1998 – Hail reported 8 miles east of Hannah.
- May 28, 1998 – Hail reported 13 miles northeast of Langdon.
- May 28, 1998 – Hail reported 10 miles southeast of Mt. Carmel.
- May 28, 1998 – Hail reported 5 miles northeast of Olga.
- June 24, 1998 – Hail reported 3 miles west of Osnabrock.
- August 12, 1998 – Hail reported in Milton area.
- August 13, 1998 – Hail reported 2 miles east of Union.
- June 6, 1999 – Hail reported 3 miles northeast of Olga.
- June 22, 1999 – Hail reported in Langdon area.
- June 22, 1999 – Hail reported in Langdon area.
- July 12, 1999 – Hail reported 5 miles west of Hannah.
- July 12, 1999 – Hail reported 10 miles north of Calvin.
- July 12, 1999 – Hail reported 4 miles west of Langdon.
- July 12, 1999 – Hail reported in Nekoma area.
- July 12, 1999 – Hail reported 2 miles northwest of Nekoma.
- May 6, 2000 – Hail reported in Osnabrock area.
- June 28, 2000 – Hail reported 4 miles southwest of Hannah.
- June 28, 2000 – Hail reported 5 miles north of Loma.
- August 13, 2000 – Hail reported 10 miles north of Calvin.
- August 28, 2000 – Hail reported 15 miles southwest of Langdon.
- August 28, 2000 – Hail reported in Milton area.
- June 19, 2001 – Hail reported 5 miles southeast of Alsen.
- June 19, 2001 – Hail reported 4 miles southwest of Loma.
- June 19, 2001 – Hail reported 2 miles west of Munich.
- June 19, 2001 – Hail reported 3 miles south of Alsen.
- August 14, 2001 – Hail reported 3 miles southeast of Sarles.
- August 14, 2001 – Hail reported 4 miles west of Dresden.

- August 14, 2001 – Hail reported in Langdon area.
- August 21, 2001 – Hail reported 2 miles northwest of Calvin.
- June 10, 2002 – Hail reported 4 miles north of Munich.
- June 10, 2002 – Hail reported 6 miles west of Osnabrock.
- July 20, 2002 – Hail reported in Loma area.
- July 29, 2002 – Hail reported 8 miles northeast of Vang.
- July 31, 2002 – Hail reported 6 miles southwest of Wales.
- August 23, 2002 – Hail reported 3 miles northeast of Olga.
- August 23, 2002 – Hail reported 3 miles southeast of Olga.
- August 23, 2002 – Hail reported 3 miles southeast of Alsen.
- August 27, 2002 – Hail reported 7 miles southeast of Maida.
- August 27, 2002 – Hail reported 6 miles east of Vang.
- August 27, 2002 – Hail reported 10 miles east of Langdon.
- August 27, 2002 – Hail reported 3 miles southeast of Calvin.
- August 27, 2002 – Hail reported 11 miles southwest of Wales.
- August 27, 2002 – Hail reported 3 miles north of Alsen.
- August 27, 2002 – Hail reported 8 miles northeast of Langdon.
- August 31, 2002 – Hail reported 2 miles west of Wales.
- August 31, 2002 – Hail reported in the Wales area.
- August 31, 2002 – Hail reported in the Sarles area.
- August 31, 2002 – Hail reported 9 miles northeast of Langdon.
- August 31, 2002 – Hail reported 7 miles east of Lang.
- August 31, 2002 – Hail reported in the Osnabrock area.
- August 31, 2002 – Hail reported in the Olga area.
- August 31, 2002 – Hail reported 10 miles east of Langdon.
- August 31, 2002 – Hail reported 6 miles northeast of Vang.
- August 31, 2002 – Hail reported 5 miles northeast of Milton.

Severe Winter Storms

- December 5, 1993 – Heavy Snow
- January 4, 1994 – Heavy Snow
- February 22, 1996 – Ice Storm
- February 22, 1996 – Ice Storm
- November 5, 1996 – Heavy Storm
- November 10, 1996 – Winter Storm
- January 30, 1997 – Ice Storm
- April 4, 1997 – Ice Storm
- February 27, 1998 – Winter Storm
- November 18, 1998 – Winter Storm
- April 3, 1999 – Winter Storm
- November 6, 2000 – Winter Storm
- December 20, 2000 – Winter Storm
- December 27, 2000 – Winter Storm
- December 5, 2001 – Winter Storm
- March 26, 2003 – Heavy Snow
- April 1, 2003 – Winter Storm
- April 2, 2003 – Winter Storm
- April 16, 2003 – Heavy Snow

Drought

- There were zero droughts in Cavalier County from January 1, 1989 to December 31, 2002.

Critical Facilities and Vulnerable Populations:

Critical Facilities:

Ambulance, Police, Fire Stations, & City Halls

- Fire Hall Calvin
- Hannah Fire Dept. Hannah
- City/Fire Hall Langdon
- City Hall Loma
- New Fire Hall Milton
- Fire Hall Osnabrock
- City Hall Osnabrock
- Fire Hall Sarles

City Maintenance & County Shops

- County Shop @ Langdon Langdon
- County Shop @ Vang Langdon
- County Shop @ Munich Munich
- County Shop @ Osnabrock Osnabrock
- County Shop @ Hannah Hannah
- Vehicle Storage/Shop Langdon
- Street Department Building Langdon
- Sanitation Storage Building Langdon

Courthouse

- Courthouse Langdon

Communications

Community Halls

- Community Center Alsen
- Community Hall Hannah
- Activity Center Langdon
- Fellowship Hall Nekoma

Dams

Lagoons

- Lagoon Cell #1 Alsen
- Lagoon Cell #2 Alsen
- Lagoon Cell #3 Alsen
- Lagoon Cell #4 Alsen
- Lagoon Cell #1 Milton
- Lagoon Cell #1 Munich
- Lagoon Cell #2 Munich
- Lagoon Cell #3 Munich
- Lagoon Cell #1 Nekoma
- Lagoon Cell #2 Nekoma
- Lagoon Cell #1 Osnabrock
- Lagoon Cell #2 Osnabrock

Lift Stations, Wells & Pumps

- Submersible Lift Station Alsen

- Submersible Lift Station Langdon
- Submersible Lift Station Langdon
- Submersible Lift Station Langdon
- Submersible Lift Station Langdon
- Submersible Lift Station Langdon
- Pump Station Mt Carmel Dam Langdon
- Raw Water Pump House Langdon
- Pump House Langdon
- Transfer Station Langdon
- Submersible Lift Station Langdon
- Langdon Booster Station Langdon
- Langdon Pumping Station Langdon
- Nekoma Repeater Equipment Nekoma
- Lift Station Milton
- Sewage Lift Station Munich
- Pump Station Nekoma
- Lift Station Nekoma
- Sewage Lift Station Osnabrock

Post Offices

Schools

- School/Gym Calvin
- Elementary School Calvin
- Elementary School/Gymnasium Langdon
- High School/Gymnasium Langdon
- Elementary/High/Gymnasium Munich

Tier II Facilities

Water Works

- Water Treatment Plant Langdon
- Water Plant Storage Building Langdon
- 250,000 Gallon N Water Tower Langdon
- Storage Building Langdon
- 250,000 Gallon W Water Tower Langdon
- Lime Storage Silo Langdon
- Water Meter Building Nekoma

Other

- Storage Building Alsen
- Generator Building Alsen
- Equipment Storage Building Hannah
- Vehicle Storage/Office Nekoma
- Vehicle Storage Building Nekoma
- Vehicle Storage Building Sarles

Vulnerable Populations:

Mobile Homes

- 2 Units Alsen

- 0 Units
 - 2 Units
 - 3 Units
- Calio
Calvin
Hannah
- 34 Units
 - 0 Units
 - 5 Units
 - 7 Units
 - 5 Units
- Langdon
Loma
Milton
Nekoma
Osnabrock
- 7 Units
 - 2 Units
- Sarles
Wales

Residential Homes

- 48 Units
 - 17 Units
 - 16 Units
 - 28 Units
 - 1182 Units
 - 11 Units
 - 61 Units
 - 32 Units
 - 88 Units
- Alsen
Calio
Calvin
Hannah
Langdon
Loma
Milton
Nekoma
Osnabrock
- 47 Units
 - 31 Units
- Sarles
Wales

Low Income, Elderly, Disabled Housing

Day Care

Head Start

Other

Loss Estimation:

Structure Loss

- Floods: \$11,648,796.66
- Wildfires: \$82,747,646.40
- Severe Summer Storms – Tornado: \$31,030,367.40
- Severe Summer Storms – Hail: \$5,591,727.90
- Severe Winter Storms: \$5,171,727.90
- Drought: \$113,945.15

Content Loss

- Floods: \$7,798,700.75
- Wildfires: \$7,798,700.75
- Severe Summer Storms – Tornado: \$7,798,700.75
- Severe Summer Storms – Hail: \$7,798,700.75
- Severe Winter Storms: \$7,798,700.75
- Drought: \$366,607.50

Total Loss

Floods: \$19,447,497.41
Wildfires: \$90,546,347.15
Severe Summer Storms – Tornado: \$38,829,068.15
Severe Summer Storms – Hail: \$13,390,428.65
Severe Winter Storms: \$12,970,428.65
Drought: \$480,552.65

Comments:

- Only property listed on the North Dakota Insurance Departments Schedule of Property are accounted for in the valuation of loss due to potential hazards in Cavalier County.
- Tier II facilities are not listed in this report. Further work would need to take place in order to identify and provide values to these properties.
- Median mobile home and median home, obtained from the US Census Bureau, values were used to calculate the approximate value of mobile homes and homes in Cavalier County.
- Because of size and location, all communities (Alsen, Calio, Calvin, Hannah, Langdon, Loma, Milton, Munich, Nekoma, Osnabrock, Sarles and Wales) were considered 100% vulnerable to wildfires.
- Post Offices located in Cavalier County were not included in this report.
- Low-income/elderly/assisted living facilities not included in this report.
- Hospitals, nursing homes and day cares are not included in this report.

Attachment II – List of Participants

Cavalier County Commission

Mayors of Cities in Cavalier County (Incorporated Cities)

City Council Members (Incorporated Cities)

County and City Auditors

Cavalier County Emergency Management

Functional Coordinators of the local emergency operations plan (LEOP)

Members: County Commission Chairman, Langdon Mayor, Tina Gustafson, Langdon and Dawn Roppel, Cavalier County Auditors, Langdon and Cavalier County Tax Assessors, County Health Nurse, Social Services Director, Langdon Fire Chief, David Zeis, Cavalier County Sheriff, Terry Johnston County Highway Superintendent.

Committee members of the local emergency planning committee (LEPC)

Members: Steve Morse, County Emergency Manager, District Environmental Health Officer, Terry Johnston, County Highway Superintendent, Langdon City and Rural Fire Chiefs, Cavalier County Sheriff, 911 Coordinator, Cavalier County Memorial Hospital

Administrator, Members of the media, member of Perry Township Lisa Gellner, a Cavalier County Commissioner, and Ron Beneda County Extension Agent.