

Yellow Medicine County

Multi-Jurisdictional

All-Hazard Mitigation Plan

Adopted
September 2015



Upper Minnesota Valley
**REGIONAL
DEVELOPMENT
COMMISSION**

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CHAPTER 1: OVERVIEW

DEFINITIONS

Hazard Mitigation

Hazard mitigation is defined as any action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards. Potential types of hazard mitigation measures include the following:

- Structural hazard control or protection projects
- Retrofitting of facilities
- Acquisition and relocation of structures
- Development of mitigation standards, regulations, policies, and programs
- Public awareness and education programs
- Development or improvement of warning systems

Hazard Mitigation Plan

Hazard mitigation planning can break the cycle of disaster-repair-disaster within a community and prepare it for a more sustainable future. Developing and putting into place long-term strategies that reduce or alleviate loss of life, injuries and property resulting from natural or human caused hazards accomplish this goal. These long-term strategies must incorporate a range of community resources including planning, policies, programs and other activities that can make a community more resistant to disaster. Mitigation planning efforts should both protect people and structures and minimize costs of disaster response and recovery. Mitigation is the cornerstone for emergency management and is a method for decreasing demand on scarce and valuable disaster response resources.

Disaster Mitigation Act of 2000

As a result of the Disaster Mitigation Act of 2000, FEMA requires jurisdictions to first have in place a multi-hazard mitigation plan, in order to be eligible for Hazard Mitigation Grant Program (HMGP) funds. Jurisdictions must update their plan within a five year time span. This became effective November 1, 2004. FEMA has provided states with funding to assist local governments in funding these plans.

The Disaster Mitigation Act of 2000 amended the Stafford Act (42 U.S.C. 5121 et seq.), which established a national program for pre-disaster mitigation. The program is meant to control Federal costs of disaster assistance and streamline the administration of disaster relief.

Hazard

A hazard is something that is potentially dangerous or harmful and is often the root cause of an unwanted outcome.

HAZARD MITIGATION

Goal

The goal of hazard mitigation is to eliminate and reduce vulnerability to significant¹ damage and/or repetitive damage from one or more hazards.

Benefits

The benefits of hazard mitigation include the following:

- Saving lives, protecting public health, reducing injuries
- Preventing or reducing property damage
- Lessen economic losses
- Minimizing social dislocation and stress
- Decreasing agricultural losses
- Maintaining critical facilities in functioning order
- Protecting infrastructure from damage
- Protecting mental health
- Reducing legal liability of government and public officials

Process

The process of hazard mitigation involves numerous steps, including:

- Identification and screening of major hazards
- Analysis of the risks posed by those hazards
- Review of existing capabilities and resources
- Development, implementation, and maintenance of specific hazard mitigation measures

Although most mitigation measures are implemented on a continual basis, the post-disaster period often presents special hazard mitigation opportunities. Because such mitigation opportunities are often more apparent immediately following a disaster, both public officials and the general public may be more willing to consider taking mitigation actions and seek special funding to assist implementation efforts.

Several post-disaster mitigation activities are "automatically" implemented in the event of a Presidential Disaster Declaration. One of the state's most notable activities involves the activation of the Minnesota Recovers Disaster Task Force. The task force is comprised of both state and federal agencies², and is chaired by the Department of Homeland Security and Emergency Management. In the event of a Presidential Disaster Declaration, all or part of the task force is activated and normally meets on a weekly or monthly basis. The meetings facilitate a coordinated and timely distribution of state/federal post-disaster recovery/mitigation funds by

¹ Defined as damage greater than 50% from one event.

²The state and federal agencies requested to provide a representative for the Minnesota Recovers Disaster Task Force will generally include those that typically provide personnel to serve on an Interagency Hazard Mitigation Team/Hazard Mitigation Survey Team and/or a damage survey team. These members include Minnesota Department of Public Safety's Division of Emergency Management, FEMA, Department of Natural Resources, Department of Trade and Economic Development, Housing Finance Agency, Pollution Control Agency, and the state Historic Preservation Office. In addition, other agencies that have applicable programs, regulations, and/or funding may be asked to provide a representative. The specific agencies selected will be determined by the nature of the disaster.

establishing mutually agreed upon (project) priorities, identifying eligible projects, and mixing and maximizing available funds in order to implement projects.

Another post-disaster mitigation activity involves the implementation of state and federal disaster recovery assistance and hazard mitigation programs, including the Federal Emergency Management Agency (FEMA) Programs and other Federal and State programs. More information on FEMA can be found at <http://www.fema.gov/>.

RELATED DOCUMENTS

The following documents have been used in compiling information for this All-Hazard Mitigation Plan:

Table 1.1 Documents Applicable to Hazard Mitigation in Yellow Medicine County

Name of Plan	Date Completed or Updated	Available	Relevant Information
Minnesota State All-Hazard Mitigation Plan	2014	Department of Homeland Security and Emergency Management	Risk Assessment, hazard profiles, county plan must conform to state Hazard Mitigation Plan
Yellow Medicine County Comprehensive Plan	2013	Planning and Zoning Office	Population profile, population projections, vision statement
Yellow Medicine County Zoning Ordinance	2009	Planning and Zoning Office	Land use, sewage and water supply, public roads, and recreational parks
Yellow Medicine County Emergency Operations Plan	May 2009	Emergency Manager/Veteran's Office	Emergency operation plans, responsibility, critical facilities
City of Canby Emergency Operations Plan	2005-2006	City of Canby	Emergency operation plans, responsibility, critical facilities
Granite Falls Hazard Mitigation Study	2001	City of Granite Falls	Flood mitigation
Flood Damage Reduction: Minnesota River at Granite Falls, MN: Locally Preferred Plan	2009	City of Granite Falls/UMVRDC	Flood hazard mitigation
Granite Falls Comprehensive Plan	2003	City of Granite Falls	Population profile, city land statistics, and maps
Echo Comprehensive Plan	1999	City of Echo	Population profile, city land statistics, and maps
Yellow Medicine County Local Water Management Plan	2010	Planning and Zoning Office	
Minnesota River Basin Plan	2001	Minnesota Pollution Control Agency	Pollution, ground water, and clarity

THE PLANNING PROCESS

Yellow Medicine County chose to engage in a comprehensive planning process to update its All-Hazard Mitigation Plan for several reasons: first, as a process, it helps the county determine its current state – social, economic and environmental trends in addition to the hazards that affect the county; second, it lays out a process that will guide the county on how it deals with both current and potential hazards; and third, it gives the public an opportunity to decide what projects they want the county and cities to complete in the future.

After passage of the Disaster Mitigation Act of 2000, the county board contracted with the Upper Minnesota Valley Regional Development Commission (UMVRDC) to write the original grant and County Hazard Mitigation plan. The Yellow Medicine County Emergency Manager, Michelle Gatz, was in charge of project coordination between the county and cities. All cities within the county participated in the original plan through adopted participation resolutions and task force delegates. Yellow Medicine County completed and adopted its initial All-Hazard Mitigation Plan, with FEMA approval, in May 2005.

An additional requirement of the Disaster Mitigation Act of 2000 requires a full All-Hazard Mitigation Plan update within five-years of adoption. To meet this requirement, Yellow Medicine County again contracted with the UMVRDC to write the plan update grant in 2008 and complete an All-Hazard Mitigation Plan update for the county by July 2010. In 2013, Yellow Medicine County and the UMVRDC collaborated to complete a plan update for 2015. Yellow Medicine County requested the continued participation from all cities within the county in updating the All-Hazard Mitigation Plan. The chart below provides information specifying county and city and participation in the 2015 plan update process.

Table 1.2 Yellow Medicine County & Cities Participation in All-Hazard Mitigation Plan Update

Jurisdiction	Adopted Current Plan (2010)	Documented Participation in Planning Process	Task Force Mtg. 1 (7/31/2014)	Task Force Mtg. 2 (9/25/2014)	Task Force Mtg. 3 (10/30/2014)	Task Force Mtg. 4 (3/26/2015)
YMC	x	x	x	x	x	x
Canby	x	x		x	x	
Clarkfield	x	x				
Echo	x	x				x
Granite Falls	x	x	x			
Hanley Falls	x	x		x	x	x
Hazel Run	x	x				
Porter	x	x				
St. Leo	x	x				
Wood Lake	x	x		x	x	x
Townships	x	x	x	x	x	x

In the spring of 2014, staff from the UMVRDC met with Tim Yerigan, the Yellow Medicine County Emergency Manager to begin discussions on how to accomplish the county All-Hazard Mitigation Plan update. At this meeting, Yellow Medicine County determined to complete a comprehensive update to the Yellow Medicine County All-Hazard Mitigation Plan to improve every chapter of the plan, with a large emphasis on adding a Hazus Flood Analysis to the plan. Chapter 3: Hazard Inventory was updated with hazardous event occurrences from 2010 to 2014, when data was available. The Local Task Force provided information on new hazards not included in the initial plan. The Risk Assessment Chapter was updated using a ranking activity completed by Local Task Force members and includes an updated historical account of frequency, severity, and economic/human impacts. The Goals, Objectives, and Mitigation Strategies Chapters were updated by addressing each strategy of the previous plan and determining its current status. Following existing strategies, new goals, objectives and strategies were discussed. This section is divided between natural and technological hazards. The city-specific mitigation strategy lists were also updated and can be found in Appendix 2. Finally, the Plan Maintenance/Implementation Chapter (Chapter 7) was reviewed by the Local Task Force and Emergency Manager to determine necessary updates.

To accomplish this plan update, Yellow Medicine County created a Local Hazard Mitigation Task Force to foster coordination, provide direction to the planning process, and ultimately develop the county's All-Hazard Mitigation Plan. Members appointed to the Local Task Force by Tim Yerigan, Yellow Medicine County Emergency Management Director, included the County staff, County Commissioners, the County Administrator, representatives from participating cities and townships, as well as school superintendents, hospital administrators, utility company representatives, and more. In order to solicit other potential task force members and special interested parties, press releases were sent to newspapers (see Appendix 12) in the county discussing the upcoming All-Hazard Mitigation plan update process and contact information for anyone interested in the joining the task force or providing additional input.

Yellow Medicine County Hazard Mitigation Task Force

Tim Yerigan, Yellow Medicine County Emergency Director
Greg Renneke, Yellow Medicine County Commissioner
John Berends, Yellow Medicine County Commissioner
Gary Johnson, Yellow Medicine County Commissioner
Ron Antony, Yellow Medicine County Commissioner
Louis Sherlin, Yellow Medicine County Commissioner
Peggy Heglund, Yellow Medicine County Administrator
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Gary Geihl, Normania Township Chairman
Lyle Danielson, Normania Township Supervisor
Paul Frank, Posen Township Supervisor/Chairman
Corey Geistfeld, Posen Township Supervisor
James Vlaininck, Swede Prairie Township
Stanley Homan, Tyro Township Chair
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Christopher Lee, Upper Sioux Community Chief of Police/Emergency Manager
Kevin Jensvold, Upper Sioux Community Chairman
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Tim O'Leary, Lyon-Lincoln Electric Cooperative
John Williamson, MN Valley Co-op Light-Power
Ted Nelson, Prairie Five Rides Program Manager
Dennis Smith, Heartland Express Transportation

While required by the Disaster Mitigation Act of 2000, the county emphasizes public participation in the plan update as it is a key way to ensure ongoing support for the plan. The general public was invited to two meetings and was notified through press releases sent to the newspaper prior to these meetings. At these meetings, the public was invited to review and provide comments on the draft plan chapters.

The planning process occurred over a twelve-month period. During that time, the Local Task Force met four times. Individuals involved in the public meetings had two primary responsibilities: 1) to comment on draft stages of the plan and 2) provide input on the next stages of the plan. It was important to include long-time residents of the county in the process for a historical perspective. As noted, press releases were sent out for all of our public meetings to local and neighboring newspapers and local radio stations. The RDC's telephone number was offered up as a point of contact for the public if they had questions on how or why to get involved in the mitigation process, or could not attend the meetings in person but still had input for the plan.

The first Local Task Force meeting was held on July 31, 2014 in Granite Falls, MN to identify potential hazards and perform a hazard inventory. To publicize the meeting and introduce the Hazard Mitigation Plan update process, a press release was sent to local newspapers prior to the meeting. Twelve people attended the first Local Task Force meeting and provided information on recent hazardous events and new hazards previously left unconsidered. Gaps and deficiencies were also brought up to date for each hazard type. Cities with representatives in attendance at this task force meeting were provided with a city survey in order to document any changes over the last five years. A second meeting was announced at the end of this meeting.

The second Local Task Force Meeting was held on September 25, 2014 in Clarkfield, MN. All Local Task Force members were notified of this meeting in advance. Prior to the meeting, the task force was provided with hazard inventory ranking information that provided a historical perspective on past hazardous events. During the meeting, the twelve task force members present performed a ranked hazard inventory, included in Chapter 4. The Local Task Force team members were informed that the following meeting would occur after cities completed individual risk assessments and reviews of the previous plan's mitigation strategies.

From September 2014 through March 2015, all cities in Yellow Medicine County participated in the update of the All-Hazard Mitigation Plan by providing updated information for land use surveys, city-specific risk assessments, and mitigation strategy surveys. The information was gathered through individual city meetings with mayors, city staff, city council members, and emergency response workers. The land use surveys provided city-specific information regarding land use changes and development trends, while the risk assessment surveys identified specific risks that may affect a city and determined city vulnerability to hazardous events. The mitigation strategy survey identified which mitigation strategies a city had completed, actively participated in, or wished to remove from its list. Finally, each city was asked to create a ranked mitigation strategy list for their municipality.

The third Local Task Force meeting was held on October 30, 2014 in Clarkfield, MN to discuss the final hazard prioritization and review mitigation strategies from the previous All-Hazard Mitigation Plan. The Local Task Force was presented with their hazard prioritization (derived from the hazard inventories completed at the second meeting) and held a discussion about the final result. The public and task force were presented with the previous plan's hazard prioritization for comparison. The next part of the meeting was a group participation activity, where Local Task Force members were asked to comment on the previous plan's mitigation strategies and determine (to the best of their knowledge) whether each strategy was completed, considered an recurring strategy (no end of strategy), not yet completed the strategy was still feasible, or if a strategy was no longer relevant. The final chapter on plan maintenance and implementation was also reviewed at this meeting.

Following the third meeting, electronic copies of the plan chapters were sent to Local Task Force members for comment. This comment period was offered to the general public through a newspaper press release by visiting the UMRDC website to review the plan online. Contact information for questions or comments was provided in the press release. During this time, the plan was also reviewed by county staff including the highway department and planning and zoning.

The fourth Local Task Force meeting took place on March 26, 2015 in Clarkfield. This meeting was open to the public for questions and comments on the draft plan. The public meeting was advertised through a press release in the local newspaper. The Yellow Medicine County Emergency Manager was present throughout the meeting to offer information and incorporate the public's comments into the All-Hazard Mitigation Plan. The Local Task Force will be informed that the final draft version of Yellow Medicine County's All-Hazard Mitigation Plan will be sent to the Federal Emergency Management Agency (FEMA) for review. The Task Force will be informed when the comments are received.

Prior to Yellow Medicine County adoption, a public hearing will be held during a Yellow Medicine County Planning Commission meeting to discuss the plan and send a recommendation to the Yellow Medicine County Board of Commissioners for approval. Once the All-Hazard Mitigation Plan is approved by the County Board, all corresponding participating cities shall adoption the plan within one year of the County adoption. Each city will be sent an electronic copy of the plan and staff will be available at a city council meeting to answer questions and facilitate the local adoption of the county's plan. A copy of the Yellow Medicine County resolution adopting the All-Hazard Mitigation Plan and a list of the resolutions passed by the county's cities will be included in Appendix 13.

The following tables summarize Yellow Medicine County's prioritize hazards and strategies. The processes that defined these priorities are detailed in Chapters 4-6.

Table 4.12 Overall Hazard Priority Levels in Yellow Medicine County

Hazard	Yellow Medicine County	Special Areas of Concern
1. Summer Weather Thunderstorm, Lightening, Hail, Wind (excluding tornado) Extreme Heat	3.34 – Moderate	County
2. Flash/Other Flooding	2.65 – Moderate	County, Granite Falls, Hanley Falls
3. Winter Weather Blizzard, Ice Storms, Heavy Snow, Extreme Cold	2.80 – Moderate	County
4. Tornado	2.79 – Moderate	County
5. Water Supply Contamination	2.78 – Moderate	County
6. Structure Fire	2.93 – Moderate	County
7. Hazardous Materials	2.54 – Moderate	County
8. Civil Disturbance/ Terrorism	2.38 – Low	County
9. Wildfire	2.19 – Low	County
10. 100-year Floods	2.13 – Low	Granite Falls/Canby
11. Drought	2.08 – Low	County
12. Wastewater Treatment System Failure	2.03 – Low	County
13. Infectious Disease	2.0 – Low	County
14. Dam Failure	1.97 – Low	Canby/Granite Falls

Table 5.3 YMC Prioritized Strategies (Natural Hazards)

Ranked	Hazard	Strategy	Affected Participating Jurisdiction
1	Violent Storms & Extreme Temperatures	Inventory and assess adequacy of the county civil defense siren system. Add sirens to cities without complete siren coverage, provide backup power to all sirens, and replace malfunctioning sirens.	County Emergency Manager, Cities of Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
1	Violent Storms & Extreme Temperatures	Build safe rooms at city, county, and state campgrounds and parks, and other locations of unprotected populations (i.e. schools, manufactured home parks, all recreational parks, apartment buildings, nursing homes, medical facilities, etc.) to protect users from violent storms.	All Cities and County, County Emergency Manager
1	Violent Storms & Extreme Temperatures	Each city should meet annually with the County Emergency Manager, emergency personnel (fire, police and ambulance), and representatives from nursing homes, schools and hospitals to assess storm safety procedures including safe rooms.	All Cities and County
1	Violent Storms & Extreme Temperatures	Research and obtain funding for implementing cell phone notifications for severe weather events and other hazardous events.	County Emergency Manager, County
2	Flooding	Identify necessary resources for flood emergencies in the region and contract for assistance.	County Emergency Manager, Cities of Canby, Clarkfield, Granite Falls, and Porter
2	Flooding	Work with state agencies, local governments, and emergency managers to address flooding issues as a region.	County Emergency Manager, Cities of Canby, Clarkfield, Granite Falls, and Porter
2	Flooding	Move the Granite Falls Fire Hall outside of the floodplain.	City of Granite Falls, FEMA, Fire Association
3	Wildfire	Work with the Minnesota DNR to include prescribed burning on all county lands and parks. Work with FSA to educate landowners about cost share funding available for controlled burns on CRP and CREP lands. Provide regulations in conservation plantings that consider controlled burns in the future.	County SWCD, FSA, DNR
3	Wildfire	Encourage DNR to give training locally. Look for funds for training if necessary.	DNR, All City Fire Departments

Table 6.3 YMC Prioritized Strategies (Manmade/Technological Hazards)

Ranked	Hazard	Strategy	Affected Participating Jurisdiction
1	Hazardous Materials	Provide staff resources to fire departments to assist them in identifying areas of high risk involving hazardous material. Require that hazardous materials locations are readily available to local fire departments. Utilize the Geographic Information Systems capability to map locations of fixed facilities using hazardous materials and associated transportation corridors. Map known locations of hazardous material/waste sites by working directly with the Pollution Control Agency. Develop a local home safety program to educate about disposable hazardous material.	County Emergency Manager
1	Hazardous Materials	Review and update the Yellow Medicine County Emergency Operations Plan that outlines procedures for dealing with hazardous material and evacuation of citizens on an annual basis. Update the Water Plan to address all hazardous material in the county as it relates to ground and surface water. Continue to expand the use of mutual aid agreements and memoranda of understanding to improve coordination among state, local and federal agencies and appropriate private sectors.	County Emergency Manager and County Zoning Administrator
1	Hazardous Materials	Ensure that all Emergency Responders participate in Rail Car Incident Response Training.	All Cities
1	Hazardous Materials	Encourage that emergency responder groups, fire department, and emergency managers are trained to at least the Hazardous Materials Awareness level.	County
2	Water Supply Contamination	Support cities and public water suppliers in developing and enforcing wellhead protection plans.	County Zoning Administrator
2	Water Supply Contamination	Look at current water plan to see if improvements can be made to protect the water supply from herbicide and pesticide use.	County Zoning Administrator, County Planning, Watershed Districts
3	Structure Fire	Purchase equipment that is needed such as new fire trucks and PTE equipment.	All City Fire Departments
3	Structure Fire	Provide school programs to youth, focusing on stoves, smoke detectors, smoking and evacuation and education to homeowners, focusing on carbon monoxide poisoning, evacuation and smoke alarms. Work with insurance companies on education and demonstrate using fire extinguishers.	All City Fire Departments

CHAPTER 2: COMMUNITY PROFILE

RELATED DOCUMENTS

The Community Profile is an important piece of the updated Yellow Medicine County All-Hazard Mitigation Plan. This profile is used as a factual data source and includes the most recent available data.

To create this Community Profile, the following Yellow Medicine County documents were referenced:

- Comprehensive Plan
- Water Plan
- Zoning Map
- Zoning Ordinance
- Land Use Map
- FEMA Regulations

The coordinated use and implementation of these combined documents create a sound foundation for all hazard mitigation projects, plans, and activities to ensure they are tied to the county's land use and environmental regulations.

GENERAL COUNTY PROFILE

Location

Yellow Medicine County encompasses 759 square miles located in three geographic regions: southwestern Minnesota, northern Great Plains, and the western Corn Belt. Yellow Medicine County lies approximately 170 miles west of the Minneapolis-St. Paul Metropolitan Statistical Area and 140 miles southwest of the city of St. Cloud. Yellow Medicine County is bordered by Lac qui Parle County to the north, Chippewa County to the northeast, Renville County to the east, Redwood County to the southeast and south, Lyon County to the south, Lincoln County to the south and South Dakota to the west. The Minnesota River forms the angled northeast border and trees, rolling hills, and vast agricultural land characterize the remainder of the county. Yellow Medicine County has nine cities and 21 townships. Location maps are located in Appendix 1.

History

Prior to the middle of the 19th century, the area that would later become Yellow Medicine County was extensively used by the Dakota people to hunt game animals and cultivate crops. The Dakota population in the area was never large and by design, left few permanent imprints upon the landscape. The onrush of settlers of European origin in the period following the Civil War permanently changed the landscape of the county.

Yellow Medicine County became a county on March 6, 1871. From 1878-1879 it was proposed to change the county name to Canby. Yellow Medicine votes were in favor, but since the new

county line would extend into Lincoln County, Lincoln would also have to approve and the County did not approve this change.

The City of Canby was platted in 1876 and later incorporated in 1879, three years after the building of the Chicago and North Western Railway. The City of Granite Falls was platted in 1872 and incorporated as a city in 1889. The name came from the granite and gneiss outcroppings of the Minnesota River. The city also had a station on the Great Northern Railway. The City of Hanley Falls was platted and founded in 1884 by the Minneapolis and St. Louis Railroad Company. The City of Hazel Run was platted in 1884 and had a station on the Minneapolis and St. Louis Railroad. The City of Porter was platted in 1881 and incorporated in 1898. It had a station on the Chicago and North Western Railway. The City of Wood Lake was platted in 1884 and was incorporated in 1891. Lastly, the City of St. Leo was incorporated in 1940. For more information, please refer to the Yellow Medicine County Comprehensive Plan or contact the Yellow Medicine County Historical Society.

Physical Characteristics

Climate and Precipitation

A wide range of seasonal temperatures, including extreme temperatures, characterizes Yellow Medicine County. According to the Midwestern Regional Climate Center, the hottest day recorded in Yellow Medicine County was 111 degrees Fahrenheit (° F) in 1936 and the coldest day was -33° F in 1936. In 1949, the county experienced a record high of 90° F in January. (Two separate websites indicated this reading was correct: weather.com and Midwestern Regional Climate Center). Table 2.1 depicts average monthly temperatures from 1971 to 2000, as well as record high and low temperatures in Yellow Medicine County from 1939 – 2000.

Table 2.1 YMC Average Monthly Temperature from 1971 - 2014 & Record Highs & Lows from 1959 - 2014

Month	Average High	Average Low	Mean	Record High	Record Low
January	24° F	4° F	14° F	68° F (1981)	-31° F (1970)
February	29° F	10° F	19° F	67° F (1981)	-30° F (1962)
March	40° F	21° F	31° F	83° F (2012)	-28° F (1962)
April	57° F	34° F	46° F	98° F (1980)	7° F (1997)
May	71° F	47° F	59° F	98° F (1959)	18° F (1967)
June	80° F	57° F	68° F	107° F (1988)	34° F (1967)
July	85° F	62° F	73° F	108° F (1966)	38° F (1967)
August	83° F	59° F	71° F	108° F (1988)	37° F (1965)
September	74° F	49° F	62° F	99° F (1978)	22° F (1974)
October	60° F	37° F	48° F	94° F (1993)	12° F (1991)
November	42° F	23° F	32° F	82° F (1999)	-16° F (1964)
December	28° F	10° F	19° F	64° F (1998)	-27° F (1983)

Source: Midwestern Regional Climate Center Monthly Data Summary, 2014. Data recorded at Canby weather station.

Total annual precipitation is approximately 26 inches, 60 percent of which primarily falls in the growing season between May and September. The sun shines 65 percent of the time in summer and 45 percent in winter. Prevailing winds are commonly from the south. Table 2.2 indicates average monthly precipitation and snowfall in Yellow Medicine County from 1971 – 2014.

Table 2.2 YMC Average Monthly Precipitation & Snowfall from 1971 - 2014

Month	Precipitation in Inches	Snowfall in Inches
January	0.82	8.20
February	0.85	7.90
March	1.71	8.80
April	2.51	4.30
May	3.05	0.00
June	4.15	0.00
July	3.08	0.00
August	2.81	0.00
September	2.57	0.00
October	2.22	0.70
November	1.43	6.80
December	0.83	8.10
Annual	26.03	44.80

Source: Midwestern Regional Climate Center Monthly Data Summary, 2014. Data recorded at Canby weather station.

Geology and Topography

Yellow Medicine County contains 488,915 acres of land and water, all influenced by glaciation. The majority of Yellow Medicine County is covered by nearly level to rolling ground moraine deposits of clay, sand, and rocks deposited by the melting glacial sheet. Relatively flat, glacial lake deposits are found in the east and central part of the county, as well as a large sandy outwash delta that covers the northeast corner of the county.

The Minnesota River flows in a deep valley that forms the eastern border of the county. The valley was cut by melted water draining from Glacial Lake Agassiz, which at one time covered most of the Red River Valley. The ancient River Warren channel of the Minnesota River Valley was created by the torrent flow of melting ice water during a period of glaciations that occurred approximately 12,000 to 13,000 years ago.

Major landscapes in the area are Coteau des Prairies and the Minnesota River Valley were formed by glacial activities of water erosion and sediment deposition. Wet prairie region is the predominant landscape feature within the county; however, many of these potholes and lakes have been lost due to artificial drainage for agriculture purposes.

Soil

Most soils in the county are of the Barnes-Aastad soil association. They are medium to fine texture, native prairie soils formed on calcareous glacial till. Soils were developed on glacial till under prairie conditions and have deep, dark topsoil. Generally the soils are dark colored, have high inherent fertility for crop production and are very good agriculture soils due to a relatively high moisture-holding capacity.

According to the Yellow Medicine County Water Plan (2010), the county soils are subject to both water and wind erosion. Water erosion results from soil removed from its original location by the force of water to lower slopes and plots. The potential for wind erosion occurs when wind velocities exceed 12 mph. The Yellow Medicine County Water Plan states that 50% of the cropland in Yellow Medicine County is prone to excessive water erosion and that 25% has the potential for severe wind erosion. The Yellow Medicine County Water Plan Update (2010) still lists erosion and sediment control as the second highest priority issue for the county. For additional information, refer to the Yellow Medicine County Water Plan (2005).

Land Use and Cover

The pre-settlement vegetation of Yellow Medicine County has undergone significant change since settlement began in the 1870s. Before it was settled, Yellow Medicine County was predominately covered with prairie, wet prairie, and river bottom forest vegetation along the Chippewa and Minnesota Rivers. Fire played a main role in limiting the woody vegetation of Yellow Medicine County, while allowing the prairie to flourish. The forests were restricted to areas where natural firebreaks (such as rivers, lakes and rough topography) prevented the spread of fire from adjacent prairie lands.

Today, land use in Yellow Medicine County is divided into four general categories: agricultural, woodland, water and wetlands, and other which includes urban uses. Agriculture is the most important use constituting approximately 92 percent of the county land, with woodlands at three percent, water and wetlands at two percent, and other uses three percent. Table 2.3 details all land covers and land uses within Yellow Medicine County.

Table 2.3 YMC Land Use & Cover

Land Use	Acreage	Percentage of Total
Urban and Rural Development	4,668	1%
Cultivated Land	251,987	75%
Hay/Pasture/Grassland	39,384	12%
Brush Land	790	0.2%
Forested	9,431	3%
Water	19,095	6%
Bog/Marsh/Fen	12,545	4%
Mining	270	0.1%
Total	338,170	100%

Source: Minnesota Land Management Information Center "Minnesota Land Use and Cover: 1990's Census of the Land (8 category statewide)".

Agriculture Agricultural land is the dominant use in every township. Farms in Yellow Medicine County have steadily increased in average size from 402 acres in 1970 to 474 in 1997, and fell to 446 acres by 2012 (Minnesota Department of Agriculture). As the size of farms increased, the number of farms decreased. In 1987 there were 1,027 farms in Yellow Medicine County. Twenty-five years later (2012), only 885 farms remain (Minnesota Department of Agriculture).

The county developed rapidly due to rich agricultural resources and opportunities. The climate, soil, topography and vegetation together all create a productive agricultural environment in Yellow Medicine County. Table 2.4 outlines the changes in corn, wheat and oats that have taken place in the last century in Yellow Medicine County:

Table 2.4 YMC Crops by Type

	Corn- 1919	Corn - 2012	Wheat- 1919	Wheat- 2012	Oats- 1919	Oats- 2012
Acres	56,668	173,654	66,184	5,477	60,945	242
Bushels/acre	27.2	144.0	14.0	44.7	24.9	65.2

Source: USDA National Agriculture Statistics Services: Census of Agriculture, 1919 & 2012

Nearly 75 percent of the land in Yellow Medicine County is considered to be prime farmland with almost all prime farmland used for crops. Corn, soybeans and sugar beets are the main crops grown. Organic farming includes smaller crops such as vegetables, beef, dairy, and other niche markets, has grown significantly in the past fifteen years.

A recent trend in land use in some parts of the county has resulted in the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are less productive because they are more erodible, subject to drought or difficult to cultivate. Table 2.5 compares the number of farms to the size of farms between 1987 and 2012. Government programs such as the Conservation Reserve Program (CRP) and the Conservation Reserve Enhancement Program (CREP) have been established to keep marginal land out of production and helped prevent erosion and improved water quality in the region.

Table 2.5 YMC Farm Comparisons from 1987-2012

Farms	1987	1992	1997	2002	2007	2012
Farms (number)	1,027	923	876	989	986	885
Land in farms (acres)	412,568	407,953	415,269	424,547	409,223	395,027
Land in farms, average size of farm (acres)	402	442	474	453	415	446

Source: USDA National Agriculture Statistics Services: Census of Agriculture, 1919 & 2012

CREP, CRP and other Government Programs The Conservation Reserve Program (CRP) is the federal government's single largest environmental improvement program and one of its most productive and cost-efficient. Currently, 7,201 acres in Yellow Medicine County enrolled in CRP as of July 2014 (Minnesota Board of Soil and Water Resources 2014).

Established in 1985, the CRP encourages farmers to voluntarily plant areas of grass and trees on land that needs protection from erosion. The purpose of planting is meant to act as windbreaks or in places where vegetation can improve water quality or provide food and habitat for wildlife. Farmers must enter into contracts with the Commodity Credit Corporation (CCC) for periods of ten to fifteen years. In return, they receive annual rental payments, incentive payments for certain activities, and cost-share assistance to establish the protective vegetation. Land eligible for enrollment includes cropland that is physically and legally capable of being cropped in a normal manner and that has been planted or considered planted to an agricultural commodity in any two years from 1992 to 1996. The acreage must also be determined eligible and suitable for any of the following practices: filter strips, riparian buffers, shelter belts, field windbreaks, living snow fences, grass waterways, shallow water areas for wildlife, salt-tolerant vegetation and wellhead protection areas.

The Reinvest in Minnesota (RIM) Program protects water quality, reduces soil erosion, and enhances fish and wildlife habitat through retiring marginal lands from agricultural production and restoring previously drained wetlands. The program pays landowners a percentage of the value of their land to enroll it in a conservation easement. Types of land eligible for the program include drained wetlands (for restoration), highly erodible cropland, riparian agricultural land, pastured hillsides and sensitive ground water areas. The state legislature created the RIM Program in 1986 as a response to the concern of a coalition of environmental, conservation, and agricultural groups. As of June 2014, Yellow Medicine County has 2,348 acres enrolled in the RIM program (Minnesota Board of Soil and Water Resources 2014). The Yellow Medicine Soil and Water Conservation District promotes and administers the RIM Program.

One way the county has been able to address pollution issues are with the Minnesota River Conservation Reserve Easement Program (CREP). CREP give landowners an opportunity to voluntarily enroll marginal cropland into a conservation easement program with up to fifteen annual federal payments and a one-time state payment. Yellow Medicine County has of 5,466 acres of CREP land as of June 2014 (Minnesota Board of Soil and Water Resources 2014). With this program, landowners in the Minnesota River Basin are paid to remove cropland from production to improve water quality and wildlife habitat.

CREP combines the federal Conservation Reserve Program (CRP) with the state RIM Program. The program's goal is to protect and enhance up to 100,000 acres of environmentally sensitive land in the 37-county Minnesota River Basin; as of June 2014, the State of Minnesota has 107,167 acres involved in the program. The Minnesota River CREP ended in September 2002.

The Wetlands Reserve Program (WRP) is a federal wetlands restoration program. It is a voluntary program that offers landowners the means and opportunity to protect, restore and enhance wetlands on their property. The USDA Natural Resources Conservation Service (NRCS) manages the program as well as provides technical and financial support to collaborate

with landowners who participate in WRP. In all cases, the landowner retains ownership and responsibility for the land, including any property taxes based on its reassessed value as wetland or nonagricultural land. The landowner controls access to the land and has the right to hunt, fish, trap, and pursue other appropriate recreational uses on the land. The landowner may sell or lease land enrolled in WRP as well. Yellow Medicine County has 597 acres in permanent easement through the Wetland Reserve Program (Minnesota Board of Soil and Water Resources 2014).

Waterfowl Production and Wildlife Management Areas Wildlife Management Areas are state-owned lands preserved for wildlife habitat. Yellow Medicine County has approximately 6,400 acres of State Wildlife Area (Minnesota DNR Data Deli). Public use of the area is permitted and the area is to be developed to accommodate activities which are directly oriented towards wildlife and fishing. Public hunting, trapping and fishing receive priority as sportsmen's tax monies are used to finance nearly all development and management, as well as much of the land acquisitions on the area. Public use is limited to levels that prevent excessive interference among users so as not to endanger wildlife and fish populations.

State Wildlife Management Areas serve multiple uses in the county. In addition to their value as wildlife habitat and nesting areas, they serve to increase nutrient, sediment and chemical retention, floodwater storage, and ground water recharge. Further, the county possesses one Scientific and Natural Area in the southern tip of the county. A land cover map can be found in Appendix 1.

Hydrology

Yellow Medicine County's lakes, streams and ground water are some of its most significant resources. They are vulnerable to pollution from a wide variety of human activities and/or disasters. Water quality has become one of the most important environmental issues facing the county and state. Water is used for domestic and residential purposes, industry, agricultural and recreation. The health, safety and welfare of the public are directly linked to the county's water supply.

Groundwater Groundwater movement in the county is to the northeast, ultimately discharging into the Minnesota River. Alternating zones of groundwater recharge and discharge occur along both the Yellow Medicine and Lac qui Parle Rivers. Most supplies of water within the county have been found at depths of less than 200 feet. Groundwater throughout the Yellow Medicine watershed is normally found less than 100 feet below the land surface. Deeper wells are located on the upland plain along the Coteau slope, lowland plains and the Minnesota River floodplain.

Wellhead Protection Wellhead protection is a means of protecting public water supply wells by preventing contaminants from entering an area that contributes water to the well or well field over a period of time. The wellhead protection area is determined by using geologic and hydrologic criteria, such as physical characteristics of aquifers and the effects that pumping has on the rate and direction of groundwater movement. A management plan was developed for the wellhead protection area that includes inventorying potential sources of groundwater

contamination, monitoring for the presence of specific contaminants, managing existing and future lands, and water uses that pose a threat to ground water quality. The goals of wellhead protection are to reduce use of costly treatment facilities, avoid drilling of new wells, and to avoid the need to clean up contaminated ground water.

The number and condition of abandoned wells in the county has been difficult to determine. In 1991, the county developed a well sealing cost share program to assist landowners with 50 percent of the cost, not to exceed \$300, to seal a well. Since then, the program provided cost share for over 600 wells.

Surface Water Yellow Medicine County is extremely limited in surface water supplies related to lakes and wetlands. According to 1969 land use data, less than one percent of the county's land surface was covered by water and according to the 1989 land use data, approximately 1.7 of the county's land surface was covered by water. Currently, Yellow Medicine has 3,921 acres of water, approximately .08 percent of county land. The western one-third of the county (Lac qui Parle watershed) is particularly lacking in surface water resources.

The steep elevation of the Coteau and poorly defined drainage patterns in the lowlands combine to affect present stream flow conditions throughout the county. Streams flowing down the escarpment of the Coteau exhibit a very unique pattern of nearly straight, parallel channels. This pattern has significant hydrologic and sedimentation implications in that it creates flash flooding threats to lowland areas. The slope on the Yellow Medicine River escarpment, for example, drops approximately 300 feet in six miles contributing to frequent spring flooding in the central portion of the county. For additional information on Yellow Medicine County surface water, refer to the Yellow Medicine County Water Plan 2005 and the Comprehensive Plan 2006.

Watersheds Three major watersheds are found in Yellow Medicine County. These follow along the Lac qui Parle, Yellow Medicine, and Redwood Rivers. Yellow Medicine County runs from the South Dakota border on the west to the Minnesota River on the east. All streams and rivers within the county eventually discharge into the Minnesota River. The western third of the county is drained by the Lac qui Parle River, the central portion by the Yellow Medicine River, the extreme southeastern by the Redwood River and remaining lands drain directly in the Minnesota River.

The county receives approximately 26 inches of precipitation each year, 60 percent of which usually falls in the growing season between May and September. The surface water bodies receive all runoff and act as temporary reservoirs.

Wetlands The term "wetland" refers to low depressions in the landscape covered with shallow and sometimes intermittent water. Wetlands are also commonly referred to as marshes, swamps, potholes, sloughs, shallow lakes and ponds. Wetlands differ in size, shape, and types of wet environment and derive their unique characteristics from climate, vegetation, soils and hydrologic conditions. Some have surface water only in the springtime during thaws or after rainstorms, while others may form shallow lakes that rarely dry up. They are classified according to depth of water, total area, and seasonal life span.

Originally, wetlands were located throughout the entire county. With the advent of intensive agriculture practices and the application of land drainage techniques, many of the wetlands located on lands that were flat and suited to agricultural use have been drained. Because of this, relatively few wetlands exist in the flat till plain areas of the county. Most of the remaining wetlands are found in the moraine areas of the northern half of the county where wetlands have either been preserved or where drainage is not economically feasible. The Yellow Medicine County Board has designated the entire county as high priority wetland preservation area.

Rivers All of Yellow Medicine County drains into the Minnesota River, which then drain to the Mississippi River. The three major rivers that flow throughout the county are the Lac qui Parle, Yellow Medicine and the Minnesota Rivers.

Lakes Lakes in southwestern Minnesota are typically large, shallow and nutrient rich. According to the Minnesota Pollution Control Agency (MPCA) assessments, none of the county's natural lakes support swimming. Two man-made lakes, Del Clark Lake southwest of Canby and Lake John in the central part of the county, do support swimming along with other recreational activities. Del Clarke Lake and the area surrounding are owned and maintained by the Lac qui Parle – Yellow Bank Watershed District.

Pollution As the surface waters in Yellow Medicine County are limited, it becomes very important to preserve and protect those water resources. The need to establish lake water quality criteria or standards has been recognized at the state, provincial and federal levels of government. The MPCA is the primary agency charged with pollution monitoring, control and abatement. The MPCA develops water quality standards for all water bodies in the state and sets effluent limits for each discharger that will maintain the appropriate standards.

Non-permitted waste disposal is a problem in some unincorporated areas. Sewage that is dumped directly into ditches contributes to the pollution problems of surface waters.

Drainage and Flooding Expansive amounts of public and private capital have been invested in draining water from the landscape. This infrastructure radically improves the drainage efficiency of the landscape in order to benefit agricultural production activities. This drainage efficiency has had negative impacts on hydrology in Yellow Medicine County in recent years. As water storage on the landscape is reduced, peak stream flows come faster and higher in response to rain events and run off. Another issue is the recent explosion of pattern tiling which has accelerated these conditions. Older drainage infrastructure and receiving waters are often not capable of meeting new peak flows generated by pattern tiling. As water flows into tiles and ditches, streams and rivers exceed capacity of receiving waters. As a result, water backs up and floods other lands within the drainage system causing great economic damage.

Yellow Medicine County has an elaborate system of public ditches as well as many private ditches that drain into the legal drain system. The county is in charge of approximately 365 miles of ditches, including both open and tiled. Yellow Medicine and Lac Qui Parle Watershed districts control ditches as well. The Yellow Medicine Watershed district controls some open ditches. Privately-owned ditches are found throughout the county and are not monitored by the county.

As the landscape hydrology has been altered, higher peak flows are carving out larger channels. Unfortunately, this often results in riverbank destabilization and soil erosion.

Debris can also add to flooding issues. Downed trees have caused problems at various bridges over the Minnesota River in past flooding events. The trees float into bridges and then get caught in the bridges forming logjams. Contractors are hired to lift fallen trees over bridges and return them to the river downstream of the bridge. The result of such actions can cause trees to flow into succeeding bridges, again needing services for removal. Large flood events can and do kill trees within the floodplain, including large Cottonwood and Maples. In subsequent flood events, these standing dead trees may be knocked down and washed away.

In 1991, Minnesota legislation approved the Wetland Conservation Act (WCA). The Act moves toward its no-net-loss goal by requiring persons proposing to drain or fill a wetland to: try to avoid disturbing the wetland, try to minimize any impact to the wetland, or to replace any lost wetland functions and values. The basic requirement is that wetlands must not be drained or filled, wholly or partially, unless replaced by restoring or creating wetlands areas of at least equal public value under an approved replacement plan. The law mandates that counties and cities administer the Wetland Conservation Act. All cities in Yellow Medicine County have by resolution requested the county to administer the Wetland Conservation Act within its incorporated boundaries. Yellow Medicine County in turn has appointed the Yellow Medicine Soil and Water Conservation District (SWCD) to administer this Act. A map of the wetlands in the county as well as a hydrology and drainage map can be found in Appendix 1.

Climate Change

The United States Environmental Protection Agency (EPA) defines climate change as any significant change in the measures of climate lasting for an extended period of time. It includes major changes in temperature, precipitation, wind patterns, or other effects, that occur over several decades or longer.

According to the EPA, the Earth's average temperature has risen by 1.4° F over the past century, and is projected to rise another 2 to 11.5° F over the next hundred years. Rising global temperatures are accompanied by changes in weather and climate. Several places have seen changes in rainfall, resulting in more floods, droughts, intense rain, and more frequent and severe heat waves. As these changes in weather and climate changes become more pronounced in the coming decades, they will likely present challenges to our society and our environment.

History of Climate Change in Yellow Medicine County

According to the Minnesota State Hazard Mitigation Plan 2014, climate change in Minnesota is already occurring in ways that will affect the environment, the economy and everyday life. Historical weather data show changing trends in some weather phenomenon over the past few decades, and future changes are likely. Intense study of these topics will continue into the future.

In addition, the state hazard mitigation plan provides historical climate trends for the Midwest and notes that,

“The NOAA Technical Report NESDIS 142-3, Regional Climate Trends and Scenarios for the U.S. National Climate Assessment, provides physical climate information for use by the authors of the Third National Climate Assessment (NCA) report, in draft form as of late 2013. One section summarizes historical conditions in the U.S. Midwest and trends in temperature and precipitation metrics that are important in the region. The historical climate conditions are meant to provide a perspective on what has been happening in each region and what types of extreme events have historically been noteworthy, to provide a context for assessment of future impacts. Some key characteristics of the Midwest historical climate identified in this report that relate to the All-Hazard Mitigation Plan include:

- *Climatic and hydroclimatic phenomena that have major impacts on the Midwest include floods, severe thunderstorms, summer drought, heat, excess rain, heat waves and winter storms.*
- *Historical, annual temperatures increased during the early 20th century to a peak in the 1930s, decreased into the 1960s/1970s, and increased thereafter. Annual temperatures have generally been well above the 1901-1960 average since the late 1990s and the decade of the 2000s is the warmest on record.*

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- *Precipitation has been near or above the 1901-1960 average for most years during the last 4 decades, and there have been no years with major precipitation deficiencies during the last 2 decades. The overall trend in annual precipitation is upward and statistically significant.*
- *The frequency and intensity of extreme precipitation has increased, as indicated by multiple metrics of extremes, including the number of 5-year storms and total accumulated precipitation during the top 10 wettest days of the year.*
- *Frequency of intense cold waves has been very low prior to the mid-1990s. Freeze-free season length averaged about 155-160 days before the 1930s; increased to about 160 days from the 1930s to 1980s; and since the 1980s has increased gradually and now averages about one week longer than during the 1930s to 1980s.*
- *Frequencies of summertime minimum temperatures of 70°F or greater have increased in many of the larger urban areas in the region, equaling very high nighttime humidity. Statistically significant positive trends were found for five cities from 1950 to 2009.*
- *Recent heat waves, such as the 1995 event in Chicago which led to 700 fatalities, have been accompanied by very high humidity levels and high nighttime temperatures, but not quite as extreme daytime high temperatures (Kunkel et al. 1996; Rogers et al. 2007)”. (Department of Public Safety and Division of Homeland Security and Emergency Management 2014)*

Yellow Medicine County is not exception to this phenomena and its location in the Midwest makes it subject to these historical climate trends that will continue in the future.

Climate Change Risks for Yellow Medicine County

Every four years, the United States Global Change Research Program publishes a National Climate Assessment Report (<http://nca2014.globalchange.gov/highlights/regions/midwest>) The 2014 report identified the following climate change impacts to the Midwest:

“Extreme heat, heavy downpours, and flooding will affect infrastructure, health, agriculture, forestry, transportation, air and water quality, and more. Climate change will also exacerbate a range of risks to the Great Lakes.”

According to the Minnesota State Hazard Mitigation Plan 2014, temperatures are rising and weather patterns are changing, with increases in severe weather events and extreme precipitation. As a result, more flooding, ice storms, drought, and higher night time temperature lows create the risks of flood damage, dangerous driving conditions and power outages due to downed powerlines (Seeley presentation 2013), wild fire and health risks, and unsafe ice cover on lakes.

The state hazard mitigation plan also notes that climate change will likely have different effects on different geographical regions of the country as well as within the state of Minnesota. These effects may include relative temperature increases and precipitation trends. In the absence of smaller scale modeling, specific predictions for smaller geographical areas are not available. Therefore, the climate change risks associated with Yellow Medicine County are not mutually exclusive, but rather the effects in the county may differ from those of the Midwest region.

Climate Change Adaptation for Yellow Medicine County

The climate change associated with Yellow Medicine County leads to increased risks from natural disasters of various types and requires that an increase in emergency preparedness will be needed to mitigate the risks that are most likely. Reducing greenhouse gas emissions are still a valuable mitigation strategy that is still being addressed by many levels of government, however the purpose of this plan is to prepare and adapt to the changes that are likely to come.

Yellow Medicine County can contact and/or utilize the state Interagency Climate Adaptation Team (ICAT) report, the Minnesota Health Department Extreme Heat Toolkit, the Climate Adaptation Partnership (CAP), and the Insurance Federation of Minnesota (IFM) to access data or information on how adaptation to climate change can be better planned for and carried out.

Socioeconomic

Population Trends

Yellow Medicine County has lost residents over every decade since 1940. In 2010, the county's population was 10,438. Yellow Medicine County's population is expected to increase slightly over the next 35 years. Table 2.6 below provides county-wide population projections for Yellow Medicine County.

Table 2.6 YMC Population Projection

	2010 Population	2030 Projected Population	2045 Projected Population	Percent Change
Yellow Medicine County	10,438	10,909	10,963	+5.0%

Sources: Minnesota County Projections by Age and Gender, 2015-2045.
Minnesota State Demographic Center, March 2014.

Yellow Medicine County is home to nine cities and twenty-one townships. The following is a brief city-specific discussion of population and number of households. Table 2.7 further breaks down population and household populations from 1980 to 2012. Table 2.8 provides a breakdown between township and city populations in the county and Table 2.9 provides detailed data of the county's population. A population distribution map can be found in Appendix 1.

Granite Falls The city of Granite Falls is located on the Minnesota River in northern Yellow Medicine County in Stony Run Township. Granite Falls is located in both Yellow Medicine and Chippewa Counties. The city is situated along Highway 23 and US Highway 212. Granite Falls has a population of 2,761 and 1,216 households making it the largest city in the county and the county seat. The population of the city is growing faster on the Yellow Medicine side than the Chippewa side. For more details, refer the Granite Falls Comprehensive Plan.

Canby The city of Canby is located in the western part of the county and is the most western city in the county. Canby is located on Highway 75 and is partly in Norman Township and partly in Hammer Township. The city's 1,795 people and 792 households make this the second largest city in the county.

Clarkfield The city of Clarkfield is located in Friendship Township on Highway 59 and MN Highway 67. The city's 863 people and 372 households make it the third largest city in the county.

Wood Lake The city of Wood Lake is located in Wood Lake Township and has a population of 439 people and 181 households. Wood Lake is also known for its lake which bears the same name.

Hanley Falls The city of Hanley Falls is located in Sandnes Township, toward the Eastern end of the county. Highway 23 runs on the eastern side of the city and also touches Hanley Falls in the southeastern corner. Hanley Falls is home to 304 persons and 107 households.

Echo The city of Echo is located in Echo Township and is the southernmost city in the county. The city has a population of 278 and 111 households. Highway 67 runs along the western side of Echo.

St. Leo The city of St. Leo is the second smallest city in the county with 100 people and 51 households. St. Leo is located in the Townships of Omro and Tyro.

Hazel Run The city of Hazel Run is the smallest city in the county with 63 people and 27 households. Hazel Run is located in Hazel Run Township.

Porter The city of Porter is located in Wergeland Township with 175 people and 79 households.

Table 2.7 YMC Population and Household (HH) Information from 1980-2012

City	1980		1990		2000		2005 (est.)		2010		2012 (est.)	
	Pop.	HH	Pop.	HH	Pop.	HH	Pop.	HH	Pop.	HH	Pop.	HH
Canby	2,143	897	1,826	805	1,903	842	1,826	897	1,795	792	1,851	748
Clarkfield	1,171	456	924	411	944	371	924	456	863	372	770	341
Echo	334	152	304	135	278	119	304	152	278	111	335	121
Granite Falls	3,451	1,339	3,083	1,308	3,070	880	3,083	1,339	2,897	1,282	2,761	1,216
Hanley Falls	265	117	246	111	323	115	246	117	304	107	288	104
Hazel Run	93	33	81	32	64	27	81	33	63	27	27	12
Porter	211	88	210	90	190	88	210	88	183	86	175	79
St. Leo	147	57	111	53	106	54	111	57	100	51	149	58
Wood Lake	420	178	406	171	436	182	406	178	439	181	403	180

Source: Annual Estimates of the Resident Population for Incorporated Places in Minnesota. Population Division: July 2009, U.S. Census Bureau 2000-2010, American Community Survey 5-year Estimates 2005, 2012.

As shown in Table 2.8 below, the distribution of population within Yellow Medicine County has significantly changed from 1970 to 2007. Table 2.8 shows an increase of people living in cities versus rural townships. The greatest change occurred from 2000 to 2010, with a 10 percent increase in city population, resulting in a final population distribution of townships (34 percent) to cities (66 percent).

Table 2.8 YMC Distribution of Population between Cities and Townships from 1970 - 2012

	1970		1980		1990		2000		2010		2012 (est.)	
Townships	7,222	50%	6,261	46%	5,262	45%	5,014	44%	3,516	34%	3,598	35%
Cities	7,327	50%	7,450	54%	6,454	55%	6,269	56%	6,922	66%	6,759	65%
Total	14,549	100%	13,711	100%	11,716	100%	11,283	100%	10,438	100%	10,357	100%

Source: Department of Administration, MN Population and Household Estimates, Census Bureau 2000.

In general, the population of Yellow Medicine County has declined since 1970 as illustrated in Table 2.9. Almost every aspect of the county profile show a negative trend including number of housing units available, number of households, and amount of people per household. The one consistent increase Yellow Medicine observed was the number of persons in group quarters. This may be due to the increased aging population within the county.

Table 2.9 YMC Population Profile

	1970	1980	1990	2000	2010	2012 (Est.)	Percent Change 2000-2012
Population	14,523	13,653	11,684	11,080	10,438	10,357	-6.5%
Land Area (sq. mile)	753	753	757.9	757.96	763	763	1.0%
Density (persons per sq. mile)	19.29	18.13	15.42	14.62	13.68	13.57	-4.7%
Housing Units	5,032	5,386	4,983	4,873	4,760	4,758	-2.4%
Households (HH)	--	4,991	4,607	4,439	4,292	4,125	-7.1%
Persons Per HH	--	2.74	2.54	2.42	2.43	2.51	3.7%

Source: US Census Bureau 2000-2010, American Community Survey 5-year estimates 2008-2012.

Household characteristics have a direct impact on land use, housing needs, social services, and educational expenses. Changes in household size have a direct and proportional effect on demand exerted and types of housing necessary for communities as illustrated in Table 2.10. As household sizes decrease the demand for housing units will increase. Only 8.4 percent of the county's housing units were vacant at the time of the 2000 Census shown in Table 2.11. The conditions, type and variety of housing offered by a community directly influence the sustainability and vitality of the entire county.

Table 2.10 YMC Housing Characteristics in 2012

Total Housing Units	Total Structures Built	Owner Occupied	Renter Occupied	Total Occupied	Vacant
2010 or later	11	11	0	11	0
2000 to 2009	256	219	26	245	11
1990 to 1999	194	109	65	174	20
1980 to 1989	209	160	37	197	12
1970 to 1979	767	495	176	671	96
1960 to 1969	492	326	92	418	74
1940 to 1959	1,088	698	248	946	142
1939 or earlier	1,741	1,270	193	1,463	278
Total	4,758	3,288	837	4,125	633

Source: US Census Bureau, 2008-2012 American Community Survey 5 year estimates

Table 2.11 YMC Vacancy Status in 2012

Status of Vacant Housing Units	
For rent	59
For sale only	49
Rented or sold, not occupied	4
For seasonal, recreational, or occasional use	128
For migrant workers	0
Other vacant	393
Total:	633

Source: US Census Bureau, 2008-2012

Age and Sex Characteristics

Since 1970, Yellow Medicine County's population has been increasingly "aging." Minnesota Planning predicted that the percent increase in the elderly population will continue to grow at a faster rate than that of the total population over the next 30 years. It is during this timeframe that the "baby boomers" will reach retirement age. This is a strong indicator of the need for many senior-related services, including senior housing and transit services. Tables 2.12 and 2.13 show the age and sex characteristics. When evaluating data, the entire county has a much larger percentage of seniors compared to the state.

Table 2.12 YMC Age Characteristics in 2012

	Under 18	18 and older	Under 40	40 and older	Under 65	65 and over
Minnesota	26%	74%	53%	47%	87%	13%
Yellow Medicine County	24%	76%	47%	53%	80%	20%
Canby	20%	80%	45%	55%	74%	26%
Clarkfield	18%	82%	49%	51%	72%	28%
Echo	37%	63%	65%	35%	84%	16%
Granite Falls	24%	76%	48%	52%	78%	22%
Hanley Falls	37%	63%	65%	35%	86%	14%
Hazel Run	7%	93%	37%	63%	93%	7%
Porter	26%	75%	45%	55%	86%	14%
St. Leo	25%	75%	61%	39%	74%	26%
Wood Lake	24%	76%	45%	55%	85%	15%

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2008-2012.

Table 2.13 YMC Sex Characteristics in 2012

	Male	Female
Minnesota	50%	50%
Yellow Medicine County	51%	49%

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2008-2012

Economic Synopsis

The biggest employer in Yellow Medicine County is the Prairie's Edge Casino and Resort with 305 employees, shown in Table 2.14. The second largest is Sanford Medical Center – Canby Campus with 270 employees, followed by Granite Falls Municipal Hospital/Manor/Home Care with 262 employees. Other major employers are Yellow Medicine East Schools with 160 employees, Fagen, Inc. with 150 employees, Project Turnabout with 135 employees, Yellow Medicine County with 124 employees, and both REM Inc. and Canby Public School District with 120 employees.

Table 2.14 YMC Major Employers

Employers	Number of Employees
Prairie's Edge Casino and Resort	305
Sanford Medical Center - Canby	270
Granite Falls Municipal Hospital/Manor/Home Care	262
Yellow Medicine East Schools	160
Fagen, Inc	150
Project Turnabout Treatment Center	135
Yellow Medicine County	124
REM, Inc. – Canby	120
Canby Public School District	120
Clarkfield Care Center	88
MN West Community & Tech College – Granite Falls & Canby Campuses	74
Archon Woodworks – Wood Lake	60
Ritalka, Inc. (SpecSys)	59
SMI & Hydraulics – Porter	50
Total	1,977

Source: Major Employers Phone Survey, 2015.

Tables 2.15 and 2.16 provide an in-depth breakdown of labor statistics and occupations by business and industry types in Yellow Medicine County from 2000. In general, approximately 63 percent of the population was employed with the largest percentage in educational services, and health care, and social assistance.

Table 2.15 YMC Labor Statistics in 2012

Employment Status - Population 16 Years and Older	Number	Percent
In labor force	5,493	66%
Civilian labor force	5,480	66%
Employed	5,247	63%
Unemployed	233	3%
Percent of civilian labor force unemployed	(X)	4%
Armed Forces	13	0.2%
Not in labor force	2,781	34%
Commuting to Work		
Car, truck, or van -- drove alone	3,756	73%
Car, truck, or van -- carpooled	636	12%
Public transportation (including taxicab)	36	1%
Walked	244	5%
Other means	67	1%
Worked at home	430	8%
Average travel time to work (minutes)	18.7	(X)

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2008-2012

Table 2.16 YMC Occupations by Industry Type in 2012

Yellow Medicine County	
Agriculture, forestry, fishing and hunting, and mining	592
Construction	464
Manufacturing	676
Wholesale trade	146
Retail trade	579
Transportation and warehousing, and utilities	334
Information	58
Finance and insurance, and real estate and rental and leasing	253
Professional, scientific, and management, and administrative and waste management services	142
Educational services, and health care and social assistance	1,354
Arts, entertainment, and recreation, and accommodation and food services	333
Other services, except public administration	159
Public administration	157
Total	5,247

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2008-2012

As shown in Table 2.17, the highest percentage of Yellow Medicine County households (40 percent) had an income between \$35,000 and \$74,999 in 2012 while the largest percentage of families (46 percent) had an income within \$50,000 and \$99,999. The median household income for Yellow Medicine County in 2012 was \$52,134. Table 2.18 shows the median household income in each of the five counties in Region 6W as well as in the State of Minnesota. Yellow Medicine County had the highest median household income in the region in 2012, but it was less than the median household income within the entire state by nearly \$7,000.

Table 2.17 YMC Income in 2012

	Households		Families	
	Number	Percentage	Number	Percentage
Less than \$10,000	188	5%	90	3%
\$10,000 to \$14,999	239	6%	50	2%
\$15,000 to \$24,999	489	12%	267	9%
\$25,000 to \$34,999	379	9%	182	6%
\$35,000 to \$49,999	677	16%	465	16%
\$50,000 to \$74,999	1005	24%	847	29%
\$75,000 to \$99,999	580	14%	486	17%
\$100,000 to \$149,999	419	10%	388	13%
\$150,000 to \$199,999	83	2%	71	2%
\$200,000 or more	66	2%	64	2%
Total	4,125	100%	2,910	100%
Median income	\$52,134	-	\$59,607	-

Note: Household count contains both families and persons living alone.

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2008-2012

Table 2.18 Median Household Income within Region and Statewide

Region	2000	2010	2012	% Change: 2000-2012
Minnesota	\$ 47,111	\$ 57,243	\$ 59,126	20.3%
Yellow Medicine	\$ 34,393	\$ 50,288	\$ 52,134	34.0%
Big Stone	\$ 30,721	\$ 42,870	\$ 45,545	32.5%
Swift	\$ 34,820	\$ 41,486	\$ 45,984	24.3%
Chippewa	\$ 35,582	\$ 43,956	\$ 46,579	23.6%
Lac qui Parle	\$ 32,626	\$ 45,550	\$ 50,203	35.0%

Source: U.S. Census Bureau American Community Survey 5-Year Estimates, 2008-2012

Tables 2.19 and 2.20 compare monthly housing expenses for renter-occupied units and owner-occupied units. In 2012, 74 percent of renters had rent lower than \$750 dollars per month, while 49 percent of mortgage holding owner-occupied spent between \$300 and \$999 dollars.

Table 2.19 YMC Renter-Occupied Gross Rent in 2012

Monthly rent	Number	Percent
Less than \$200	29	4%
\$200 to \$299	72	10%
\$300 to \$499	230	32%
\$500 to \$749	200	28%
\$750 to \$999	116	16%
\$1,000 to \$1,499	65	9%
\$1,500 or more	2	0%
No cash rent	123	X
Total	837	100%

Source: U.S. Census Bureau American Community Survey
5-Year Estimates, 2008-2012

Table 2.20 YMC Owner-Occupied Monthly Housing Costs in 2012

Monthly payments	Number	Percent
With a mortgage	1,686	51%
Less than \$300	13	1%
\$300 to \$499	80	5%
\$500 to \$699	213	13%
\$700 to \$999	507	30%
\$1,000 to \$1,499	541	32%
\$1,500 to \$1,999	203	12%
\$2,000 or more	129	8%
<i>Median of mortgaged units</i>	<i>\$1,024</i>	<i>X</i>
Not mortgaged	1,602	49%
<i>Median of not mortgaged units</i>	<i>\$374</i>	<i>X</i>
Total	3,288	100%

Source: U.S. Census Bureau American Community Survey
5-Year Estimates, 2008-2012

Community Infrastructure

This section identifies Yellow Medicine County's schools, public facilities, parks and natural resources, and available modes of transportation offering transit, airport facilities, roads, and a multitude of trail opportunities. A complete listing of telecommunication and power facilities has also been provided, as well as city-specific water and sewer systems currently in place throughout the county.

Schools

Eight different school districts cover Yellow Medicine County, with eight different schools located in the county itself. These schools are shown in Table 2.21. Yellow Medicine County also has technical colleges located in Granite Falls and Canby.

Table 2.21 YMC Schools and Locations

Yellow Medicine County Schools	Address	City
Area Learning Center	885 Prentice Street	Granite Falls
Bert Raney Elementary	555 7 th Avenue	Granite Falls
Yellow Medicine East Junior High School	450 9 th Avenue	Granite Falls
Yellow Medicine East Senior High School	450 9 th Avenue	Granite Falls
Clarkfield Area Charter School	2649 Highway 59	Clarkfield
Echo Charter School	101 Rocket Avenue	Echo
Canby Elementary	601 4 th Street	Canby
Canby Secondary School	106 Ring Avenue	Canby
MN Community Tech College	1593 11 th Avenue	Granite Falls
MN Community Tech College	1011 W First Street	Canby

Important Public Facilities

Public Facilities for each community are mapped in Chapter 4 in the Community Risk Assessment Section as "Community Assets". Important public facilities may include city and town halls, county courthouse, libraries, community centers, parks, churches and historic resources. These can be found in Table 2.22. These places provide both public services and create an important sense of community character and are located in cities. Parks and wildlife management areas are located throughout the county.

Table 2.22 YMC City Facilities

Granite Falls	Addresses
Kilowatt Community Center	600 Kilowatt Drive
Prairie's Edge Casino	5616 Prairies Edge
Lee Mar Ranch	W Hwy. 212
Memorial Park	E Hwy. 67
Upper Sioux State Park	E Hwy. 67 (1,280 Acres and 18 mile of trails)
Yellow Medicine County Court House	415 9 th Avenue
Project Turnabout	660 18th Street
City Hall	641 Prentice Street
Canby	Addresses
Canby Community Center	110 Oscar Street North
Canby Swimming Pool	202 Division Street West
Yellow Medicine Fairgrounds	305 Fairgrounds Street West
Clarkfield	Addresses
City Hall/Community Center	904 10 th Avenue
Emergency Medical Services (Fire/EMT)	1250 15 th Avenue
Clarkfield Community Library	812 10 th Avenue
Clarkfield Swimming Pool	15 th Avenue
Echo	Address
Echo Community Center/City Offices	342 2nd Avenue West
Hanley Falls	Address
City Offices	109b North First Street
Minnesota Machinery Museum	100 North First Street
Hazel Run	Address
City Hall	431 1 st Street North
Porter	Address
Community Hall	113 Park Ave North
St. Leo	Address
St. Leo Community Center	100 Washington Street North
Wood Lake	Address
Wood Lake Community Center	88 2nd Avenue

State Park, County Parks, Lakes and Historic Resources

There is one state park and two county parks located in Yellow Medicine County. Within Sioux Agency Township, the Upper Sioux Agency State Park's northern boundary is bordered by the Minnesota River. The Yellow Medicine River and Trunk Highway 67 bisect portions of the park. This area is well endowed with natural prairie and is known for its location as the focal point for distributing food and supplies to the Dakota Indians prior to the Sioux Uprising of 1862. The park is located approximately seven miles southeast of Granite Falls.

Oraas County Park is located seven miles south of Clarkfield within Normania Township along US Highway 59. Oraas Park consists of 28 acres, and, because of its location next to a major highway, many motorists use this park and its facilities for picnicking and outdoor activities. Spring Creek flows through the park, which offers an aesthetic value, along with a woodlot and natural prairie vegetation.

Timm County Park is located approximately 4.5 miles north of the City of Wood Lake on the north shore of Wood Lake in Wood Lake Township. This park consists of 17 acres of heavily wooded terrain. When combined with the setting of the lake, this park provides scenic attractions for recreational enjoyment.

Del Clark Lake is two miles southwest of Canby in Norman Township. This man-made lake, formed by the largest earthen dam ever built by Soil Conservation Service in the state of Minnesota, is 155 acres in size. The recreation area includes a boat landing, bathhouse, picnic area, beach, camping area, hiking trails and fishing. In 1994, the lake was drained and a slurry trench was dug to prevent seepage through the dam and extend the life of the structure. The work was completed in 1994 and the lake was refilled in 1995.

Lake John is a man-made lake formed by Yellow Medicine River Watershed Flood Control Dam No. 8 located on a tributary of Mud Creek. This 20 acre lake is located one mile north and three miles west of Porter within Norman Township. The lake is stocked with bass, crappies, northerns, and blue gills. Lake John was the first recreation area in Yellow Medicine County with a sandy swimming beach, a wildlife area and an arboretum.

The Yellow Medicine County Historical Society Museum is located in Granite Falls in the Volstead House, which is on the National Register of Historic Homes. The Volstead House was home to Congressman Volstead from 1894 until 1930. The Lund-Hoel House, built in 1897, is also on the National Register of Historic Homes. The Lund-Hoel House is located on Highway 75 in Canby. The Minnesota Machinery Museum is located in Hanley Falls near Highway 23 and is open Mid-May through September.

Transportation

Roads

Yellow Medicine is well served by an extensive roadway network that connects the county with the rest of the region and Minnesota. State, county, township, and city roads are all included in the roadway network. It is the primary means of transportation for both goods and people within and out of the county. A map of the Yellow Medicine County Transportation system can be found in Appendix 1.

Trunk Highway System

Yellow Medicine County has five Minnesota State trunk highways: 67, 68, 23, 19, and 274 and three US trunk highways including 75, 212, and 59. The total mileage of the State and US trunk highways are found in Table 2.23 below. These roads are constructed and maintained by the Minnesota Department of Transportation (MnDOT).

Table 2.23 YMC Highways

Miles of State and US Highways	
US Highways	MN Highways
42.4	94.6

County Roads

These roads are established, constructed and improved by the county board. They are under the sole authority of the county board. There are 511 miles of county roads in Yellow Medicine County.

Township Roads

A township road is established by and under the authority of the township board or reverted to township jurisdiction by the county board. These roads are constructed and maintained by township boards. There is a total of 796.6 miles of Township roads in Yellow Medicine County.

City Streets

These roads serve as direct access from residential properties and/or commercial establishments. City streets are classified as any street under the jurisdiction of a municipality not otherwise designated as a trunk highway, county state aid street, highway, or county highway. There are 54.9 miles of city roads in Yellow Medicine County.

Trails

Yellow Medicine County has a variety of trails available to the public located throughout the entire county. Table 2.24 below identifies all major trail systems and their particular uses including snowmobiling, walking, and horse trails.

Table 2.24 Yellow Medicine County Trails

Trail Name	County	Location/ Descriptions	Length	Surface	Use
Upper Sioux Agency State Park	Yellow Medicine	In State Park	50 miles	Natural	Walk-18 miles Snowmobile-14 miles Horse-16 miles Ski – 2 miles
Snowdrifters Snowmobile Trail	Chippewa, Lac qui Parle, Yellow Medicine	Routes throughout counties	103 miles	Snow	Snowmobile
Canby Trail	Yellow Medicine	Canby to Del Clark Lake Park	2 miles	Paved	Walk, Bike, Inline Skate
Minnesota River Canoe Route	All Counties	Minnesota River	Unknown	Water	Canoeing

Source: UMRDC Trail Planning Guide 2002 and UMRDC Trails Plan 2013

Transit

Mass transit is an essential public service. Mass transit helps to provide an increased capacity on heavily traveled roads, transportation access to disabled persons or those otherwise unable to drive. Mass transit supports dense land use development, decreases dependence on car use, and helps to decrease air pollution emitted by personal car use.

Yellow Medicine County has two mass transit providers. Granite Falls Heartland Express serves the Granite Falls area. The buses run from approximately 6:00 a.m. until dark, Monday through Friday. Granite Falls Heartland Express operates one vehicle (small bus) carrying 27,796 riders driving 30,142 miles each year. Prairie Five Rides serves Yellow Medicine County as well as the other 4 counties in the Upper Minnesota Valley. The buses run from approximately 6:00 a.m. to 6:00 p.m., Monday through Friday. In 2013, Prairie Five RIDES provided 140,928 rides, traveling a total of 692,045 miles. This is an increase from 2008 when Prairie Five RIDES provided 83,405 rides, traveling a total of 399,071 miles. See Table 2.25 below for a breakdown of transit options available to cities in Yellow Medicine.

Airport

Yellow Medicine County has two airports located in the cities of Canby and Granite Falls. The Canby Municipal Airport has 4,400 feet of runway, 75 feet wide, and is able to accommodate a large class of business aircraft. The Granite Falls Municipal Airport has 4,350 feet of paved runway that is 75 ft. wide. It is estimated that the Granite Falls Municipal Airport lands six planes per day. See Table 2.25 below for a breakdown of available airports.

Railroads

Three active rail lines operate in Yellow Medicine County. A portion of Burlington Northern Santa Fe (BNSF) Willmar – Sioux City mainline track travels 15 miles through the county, generally parallel to the Highway 23 as it passes through Hanley Falls and Granite Falls. BNSF runs 16 trains per day at up to 49 miles per hour. A 14 mile segment of the BNSF Hanley Falls – Madison branch line travels from Hanley Falls northwest through Hazel Run and Clarkfield. BNSF runs 2 trains per day at up to 25 miles per hour on this segment. The BNSF owns about 1,584 miles of line, or about 35 percent of the total rail mileage in the state. A portion of the Minnesota Prairie Line (Norwood – Hanley Falls) travels 14 miles through the southeast part of the county, through Hanley Falls, Wood Lake, and Echo. Traffic is Intermittent with a speed limit of 10 mph. Rail systems are mainly for agriculture purposes and run by grain elevators. See Table 2.25 below for a division of railroads running through cities.

Table 2.25 YMC City Breakdown of Available Infrastructure

City	Transit	Airports	Railroads
Canby	Prairie Five RIDES & Canby RIDES	Yes (Paved)	No
Clarkfield	Prairie Five RIDES	No	Burlington Northern Santa Fe
Echo	Prairie Five RIDES	No	Minnesota Prairie Line
Granite Falls	Prairie Five RIDES & Heartland Express	Yes (Paved)	Burlington Northern Santa Fe & Twin Cities and Western
Hanley Falls	Prairie Five RIDES	No	Burlington Northern Santa Fe & Minnesota Prairie Line
Hazel Run	Prairie Five RIDES	No	Burlington Northern Santa Fe
Porter	Prairie Five RIDES	No	No
St. Leo	Prairie Five RIDES	No	No
Wood Lake	Prairie Five RIDES	No	Minnesota Prairie Line
Upper Sioux Community	Prairie Five RIDES	No	No

Telecommunication and Power Facilities

Internet, Electric, Gas, and Telephone

Table 2.26 below indicates the telecommunication and power facilities within Yellow Medicine County.

Table 2.26 YMC Telecommunication and Power Facilities

City	Internet	Cable	Phone	Cellular	Electric	Gas
Echo	Arvig/ MVTW Wireless	Clara City Telephone	Arvig	Verizon/ Vonage	Xcel	Great Plains Natural Gas
Hazel Run	--	--	Frontier	--	Xcel	--
Granite Falls	MVTW Wireless	Mediacom	Century Link	Verizon/ AT&T	CMMPA/ City of Granite Falls	Great Plains Natural Gas
Clarkfield	MVTW Wireless/ Minnesota Network Solutions/ Frontier	U.S. Cable	Frontier	Verizon/ All-Tell	Xcel	Great Plains Natural Gas
Canby	Frontier/ Charter Communications/ Farmer's Coop Association	Charter Communications	Frontier	Verizon/ Hammer Communications	Ottertail	Aquila
Wood Lake	Arvig / MVTW Wireless	Clara City Telephone	Arvig	Verizon	Xcel	Great Plains Natural Gas
St. Leo	MediaCom	MediaCom	Frontier	--	Xcel	--
Hanley Falls	Clara City Telephone/ Frontier	Clara City Telephone	Frontier	Verizon	Xcel	--

Radio

Yellow Medicine County has one radio station located in Granite Falls. The station identification is KKRC and KOLV. This station serves as a resource during bad weather for information on closings and travel information.

Sewer and Water Systems

Lincoln Pipestone Rural Water receives a water supply from the Burr Treatment Plant and provides it to the cities of Echo, Hazel Run, Porter and St. Leo. Lincoln Pipestone interconnects with the cities of Canby and Marshall to service each other in emergency situations. Marshall and Canby have their own wells and water treatment systems. All other cities in Yellow Medicine County have municipal water system from their own wells.

All cities in Yellow Medicine County have permits to discharge wastewater. Table 2.27 lists the drainage systems for all cities in Yellow Medicine County. Hazel Run installed a new wastewater facility in 2014. It has 10 mound systems within the city as well as 2 performance tanks and 4 mounds located outside of town. The Hazel Run system is monitored by Joel Adelman of Pipestone County. Haney Falls can provide assistance to Hazel Run if needed.

Table 2.27 YMC Public Drainage System

City	Drainage Source
Canby	Canby Creek
Clarkfield	County Ditch #9
Echo	County Ditch #1B Lateral A
Granite Falls	Minnesota River
Hanley Falls	County Ditch #41
Hazel Run	County Ditches #44 & #9
St. Leo	Ditch to Spring Creek
Porter	Ditch to Mud Creek
Wood Lake	JD Ditch #10

Emergency Response

A county's ability to respond to an emergency situation or event is based on service areas, facilities and equipment. An understanding of response times and abilities is critical in protecting the citizens of Yellow Medicine County. The existing facilities and equipment in the county are intended to address local needs and support regional needs. Yellow Medicine County is considered a mutual aid county and provides and receives support from adjacent counties.

Medical Facilities

Yellow Medicine County is served by two hospitals and three clinics (Table 2.28). There are seven ambulances in the county. Granite Falls has 3 ambulances and Clarkfield and Canby each have two.

Table 2.28 YMC Hospitals and Clinics

Hospitals and Clinics	Address	City
Affiliated Community Medical Center	295 10th Ave.	Granite Falls
Granite Falls Municipal Hospital	345 10th Ave.	Granite Falls
Clarkfield Medical Clinic	812 10th Ave.	Clarkfield
Sanford Medical Center	119 First St. W	Canby

Fire Services

There are no full-time fire departments in Yellow Medicine County. All fire departments are volunteer-based with responsibilities being divided into four response zones. The Department of Natural Resources is responsible for fire protection on state forest and park land. The DNR works closely with local fire units for protection of these lands through contracting agreements. Both the U.S. Forest Service and the DNR cooperate with local fire fighters whenever danger of woodland and urban fires is elevated. Additionally, all volunteer fire departments have mutual aid agreements. Fire departments and resources are detailed in Table 2.29.

Table 2.29 YMC Fire Capabilities

City	Pumpers	Tankers	Grass Rigs	Air Packs	Number of Firemen
Canby	3	3	2	25	25
Clarkfield/ Hazel Run	2	2	2	28	28
Echo	1	1	1	20	20
Granite Falls	2	2	3	30	32
Hanley Falls	2	1	1	11	23
Porter	3	2	1	-	25
St. Leo	1	1	-	3	18
Wood Lake	2	2	1	20	20

Source: Yellow Medicine County, City Surveys 2014

Other equipment not noted in the above table include boats, thermal imaging camera, air fill stations, new fire hall or additions to existing fire halls, dry hydrants, Jaws of Life, extraction tools, hoses and nozzles, generators, transfer pumps, First Responder Vehicles, van, water augers and a Cascade System. All of this additional equipment is spread throughout Yellow Medicine County. Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Porter, St. Leo and Wood Lake Fire Departments are members of the West Central Firefighters Association. These community fire departments agreed to be of help to other communities in the West Central Firefighters Association in case of an emergency. A map of the fire department districts in Yellow Medicine County can be found in Appendix 1.

Public Safety

Emergency Operations Center

Yellow Medicine County's Emergency Operations Center is located in Granite Falls.

Emergency Warning Systems

The Yellow Medicine County Public Service Answering Point (PSAP) is the Yellow Medicine County warning point. The Marshall NAWAS Warning Point is responsible for disseminating all watches and warnings to the Yellow Medicine County warning point, except warnings for conditions generated within the county itself. The Yellow Medicine County Sheriff has overall responsibility to ensure that all notifications received by the warning point are handled properly. The Yellow Medicine County warning points are responsible for proper receipt and dissemination of all emergency notifications. All cities in Yellow Medicine County have emergency sirens that are in working condition, but some are in need of updating. Back-up power is needed for most of the sirens.

Police Stations

Law enforcement capabilities are spread throughout Yellow Medicine County. All except two cities (Granite Falls and Canby) are serviced by the Yellow Medicine County Sheriff's Department. Law enforcement capabilities are shown in Table 2.30 below. The City of Clarkfield has a County Deputy Sheriff stationed in town per their contract with the county.

Table 2.30 YMC Law Enforcement Capabilities

City	Officers	Squads
Granite Falls	5 Full-Time 6 Part-Time	2
Canby	3 Full-Time 4 Part-time	2
Upper Sioux	4 Full-Time 4 Part-Time	4
Yellow Medicine Sheriff's Office	10 Full-Time 6 Part-Time	10

Source: City Surveys 2014

Countryside Public Health

Countryside Public Health Services is the County Department of Health for Chippewa, Swift, Lac qui Parle, Big Stone and Yellow Medicine counties. Part of their mission is designed to protect the health of the general population by emphasizing the prevention of disease, injury, disability and death through effective coordination, use of community resources, and provide education, training, WIC program, disease prevention and control and environmental programs. Countryside Public Health has the ability to respond to health emergencies and is currently developing a Medical Reserve Corp (MRC) for volunteers.

County Highway Department

The County Highway Department has equipment that can be used in case of an emergency from tornados to floods.

Table 2.31 County Highway Department Equipment List

Granite Falls 11 Vehicles for wide range of uses 3 Tractors and 9 Trailers 3 Dump Trucks 1 Bituminous Distributor 1 Loader, Backhoe, Grader, Dozer 4 Pickups 1 Ford Expedition 4x4	Canby 5 Dump Trucks 2 Tractors 1 Grader 1 Skid Loader, Loader, Backhoe, Excavator 3 Pickups
Clarkfield 1 Dump truck, Loader 1 Grader	Porter 1 Grader, Dump Truck
	Wood Lake 1 Grader, Dump Truck 1 Pickup

Property

Land Uses

Land uses are regulated in Yellow Medicine County through the county ordinances. Cities in Yellow Medicine County have zoning ordinances that regulate the building, construction, and location of manufactured home parks.

Manufactured Home Parks

There used to be a mobile home park in Canby, but it has been closed. Manufactured home parks located outside of cities are allowed as a conditional use and must follow guidelines as set forth in the Yellow Medicine County Ordinance Code.

Current Codes

Yellow Medicine County currently has a floodplain ordinance. The floodplain ordinance regulates permitted uses and development in the 100-year floodplain. Granite Falls and Canby also have city specific floodplain ordinances.

Granite Falls adopted the universal building code. Construction of new buildings in Granite Falls requires the use of tie-downs in the foundation in order to withstand high wind conditions. Other cities and the county do not regulate the use of tie-downs.

CHAPTER 3: HAZARD INVENTORY

The hazard inventory chapter is divided into two parts: Natural Hazards and Manmade/Technological Hazards, defined by the Minnesota State Hazard Mitigation Plan.

Definition – Natural Hazard

Natural hazards are those presented by the physical world, rather than those presented by humans. In a natural hazard, there is an interaction between the physical world, the constructed environment, and the people that occupy them. Natural Hazards are primarily atmospheric or geologic.

Definition – Technological Hazard

Technological hazards are those presented by humans, rather than those presented by nature. They are comprised of substances and processes that are flammable, combustible, explosive, toxic, noxious, corrosive, oxidizers, irritants, or radioactive.

During the first YMC All-Hazard Mitigation Task Force Meeting, the hazards included in the previous plan were reviewed. The task force felt it was important to include erosion as a hazard in this plan update as soil and wind erosion have been increasing issues in Yellow Medicine County over the last decade as more and more land has been converted into cropland. The task force also decided that adding a section on climate change to all applicable hazards would be a good way to introduce the hazard into the plan. As climate change becomes more prevalent in the region, subsequent plans can further explore this topic in terms of mitigation strategies. Table 3.1 lists each of the hazards previously included in the plan, as well as the new hazards included in this plan update.

Table 3.1 Hazards in YMC

Hazard	In Previous Plans	Addition to 2015 Plan
Violent Storms	X	
Extreme Temperatures	X	
Floods	X	
Erosion		X
Drought	X	
Wildfires	X	
Dam Failures	X	
Climate Change		X
Infectious Disease	X	
Fire	X	
Hazardous Material	X	
Water Supply Contamination	X	
Civil Disturbance/Terrorism	X	

NATURAL HAZARDS – PRESENTED BY THE PHYSICAL WORLD

Introduction

Source: Minnesota State Hazard Mitigation Plan

Guarding against the unpredictable forces of nature has always been a goal of society. Ways to accomplish this goal include informing society of known hazards and constructing building environments to prevent serious damage from occurring. As the forces of nature can strike with unpredictable fury, there is always an element of risk associated with natural hazards. To inventory hazards that have occurred in Yellow Medicine County the Local Task Force committee identified hazards, established relationships between hazards, recognized current plans and programs in place to mitigate hazards, and highlighted gaps and overall deficiencies in current plans and programs.

For the purposes of this plan, natural hazards identified are organized into these groups:

1. Violent Storms

a. Winter Storms

Blizzards, Ice Storms, Sleet Storms, Heavy Snow or Snow Storm

b. Summer Storms

Thunderstorms, Lightning, Tornadoes, Hailstorms, Windstorms

2. Extreme Temperatures

a. Summer Heat

b. Winter Cold

3. Floods

4. Erosion

5. Drought

6. Wildfires

7. Dam Failures

Violent Storms

Violent storms can occur throughout the year in Yellow Medicine County. For practical purposes, violent storms are categorized as summer or winter storms although there is no sharp end or beginning to when they might occur.

Winter Storms

Yellow Medicine County experiences three basic types of winter storms: blizzards, heavy snow events and ice storms. Ice storms include freezing rain, freezing drizzle and sleet.

Blizzards Blizzards, the most violent of winter storms, are characterized by low temperatures usually below 20° F, strong winds in excess of 35 miles per hour, and blowing snow that creates visibility issues at one-quarter mile or less for at least three hours. Blowing snow can result in whiteouts and drifting on the roadways, leading to stranded motorists and the difficulty or inability of emergency vehicles to respond to incidents. While blizzards can occur in Yellow Medicine from October through April, they most commonly occur from November through the end of March.

Ice Storms Freezing rain, the most serious of ice storms, occurs during a precipitation event when warm air aloft exceeds 32° F while the surface remains below the freezing point. When precipitation originating as rain or drizzle comes into contact with the surface of physical structures, ice forms on all surfaces causing problems for traffic, utility lines, and tree limbs.

Sleet Storms Sleet forms when precipitation, originating as rain, falls through a rather large layer of the atmosphere with below freezing temperatures. This allows raindrops to freeze before reaching the ground. Sleet is also commonly referred to as ice pellets. Sleet storms are usually of shorter duration than freezing rain and generally create fewer problems.

Heavy Snow or Snowstorm In Minnesota, six or more inches of snow in a 12-hour period or eight or more inches of snow in a 24-hour period defines a heavy snow event. Snow is considered heavy when visibility drops below one-quarter mile regardless of wind speed.

Table 3.2 YMC Winter Events from 1993 - 2013

Winter	1993-1994	1994-1995	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003
Number of Events	5	4	10	9	1	4	1	7	3	2
Winter	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Number of Events	4	2	3	1	3	7	7	10	1	7
Events include: blizzards, winter storm, heavy snow, blowing snow, ice storm, glaze, low and extreme wind chills										

Source: National Climatic Data Center – Event Query 2014

History of Winter Storms in Yellow Medicine County

The winters of 1995–1996 and 1996–1997 were exceptionally extreme. In the winter of 1995–1996, four blizzards were reported. Three blizzards were reported in 1996–1997. In addition, heavy snow, high wind and winter storms made these two winters difficult for Yellow Medicine County. There were many school cancellations and high costs to remove snow. The winter of 1996–1997 was declared a Presidential Disaster because of the snow emergency. Snow removal was extremely expensive because of the large amounts of snow, which damaged and destroyed buildings. The Echo Community Center roof collapsed after the snow load in 1997.

The two weather stations used in and near Yellow Medicine County are located in Canby and Montevideo (Chippewa County). Table 3.3 and 3.4 shows the snowfall extremes for these two weather stations. Canby had a record season of 87.7 inches of snowfall in 2010–2011. The blizzard of January 17th and 18th in 1996 dropped record amounts of snow.

Table 3.3 YMC Snowfall Extremes by Month from 1951 - 2013

Month	Canby		Montevideo	
	High (in)	Year	High (in)	Year
January	29.0	1979	33	1982
February	29.0	2011	28	1962
March	36.0	1951	44	1951
April	31.5	2008	23.5	2013
May	1.5	1954	1	1954
June	0	-	0	-
July	0	-	0	-
August	0	-	0	-
September	0	-	0	-
October	6.0	1976	6	1991
November	25.5	1975	25	1985
December	33.5	2009	32.5	2010
Season (Jul-Jun)	87.7	2010-2011	82.2	1983-1984

Source: Midwest Regional Climate Center 2014

**Table 3.4 YMC Largest One-day Snowfall
in Canby and Montevideo from 1951 - 2013**

Month	Canby		Montevideo	
	1-Day Max (in)	Date	1-Day Max (in)	Date
January	10	1/11/1975	12	1/18/1996
February	12	2/21/2011	12	2/21/2011
March	16	3/15/2002	14	3/3/1989
April	14	4/26/2008	8	4/11/2013
May	1	5/2/1954	1	5/2/1954
June	-	-	-	-
July	-	-	-	-
August	-	-	-	-
September	-	-	-	-
October	4	10/24/1995	6	10/31/1991
November	16	11/20/1975	12	11/28/1983
December	14	12/1/1981	12	12/9/2012
Season (Jul-Jun)	16	3/16/2002 & 12/1/1981	14	3/3/1989

Source: Midwest Regional Climate Center 2014

Relationship to Other Hazards – Cascading Effects

Because most of Yellow Medicine County is relatively flat, dangerous winter conditions are created when wind gusts create drifting, white outs, and wind chills. Drifting and blizzard conditions can occur even if there are no new snow accumulations. During the winter of 1996-1997, drifts were higher than most street vehicles. The winter of 1996-1997 also contributed to record spring flooding. This event is discussed in the flooding section.

Summer Storms

Thunderstorms Thunderstorms are the most common summer storm in Yellow Medicine County, occurring primarily during the months of May through August with the most severe storms most likely to occur from mid-May through mid-July. Thunderstorms are usually localized and produced by cumulonimbus clouds, always accompanied by lightening, and often have strong wind gusts, heavy rain, and sometimes hail or tornadoes.

Lightning While windstorms and tornadoes are significant hazards associated with severe thunderstorms, lightning is the most frequent hazard associated with thunderstorms and the hazard that results in the greatest loss of life. Lightning occurs to balance the difference between positive and negative discharges within a cloud, between two clouds and between the cloud and the ground. For example, a negative charge at the base of the cloud is attracted to a positive charge on the ground. When the difference between the two charges becomes great enough a lightning bolt strikes. The charge is usually strongest on tall buildings, trees and other objects protruding from the surface. Consequently, such objects are more likely to be struck than lower objects.

While cloud-to-ground lightning poses the greatest threat to people and objects on the ground it actually accounts for only 20 percent of all lightning strikes. The remaining lightning occurs

within the cloud, from cloud to cloud, or from the ground to the cloud. Within-cloud lightning is the most common type.

Tornadoes Tornadoes are the most violent of all storms. A tornado is a rapidly rotating column of air, spawned by a cumulonimbus cloud. When it drops to the ground it can create significant damage and loss of life. Tornadoes always occur in association with thunderstorms. While somewhat more common in southern Minnesota, they have occurred in all counties in the state.

Tornadoes are most likely to occur during warm, humid spells during the months of May, June, July, and August but have occurred as early as March and as late as November in Minnesota. On occasion, tornadoes called cold air funnels, occur after the passage of a cold front when air is much less humid but the air aloft is very cold creating enough instability to make funnel clouds. Most tornadoes occur during the warm part of the day – late afternoon or early evening; over 80 percent of tornadoes occur between noon and midnight.

The tornado's path typically ranges from 250 feet to a quarter of a mile in width. The speed of a tornado varies but commonly is between 20 and 30 mph. However, larger and faster tornadoes have occurred in Minnesota. Most tornadoes stay on the ground for less than five minutes. Tornadoes frequently move from the southwest to the northeast, but can vary in direction.

Hailstorms Hail is considered ice and is a result of severe thunderstorms. Hail is formed when strong updrafts within the cumulonimbus cloud carry water droplets above the freezing level or when ice pellets in the cloud collide with water droplets. The water droplets freeze or attach themselves to the ice pellets as strong updraft winds toss the pellets and droplets back up into colder regions of the cloud. Both gravity and downdrafts in the cloud pull the pellets down, where they encounter more droplets that attach and freeze as the pellets are tossed once again to higher levels in the cloud. This process continues until the hailstones become too heavy to be supported by the updrafts and fall to the ground as hail.

Most hail in Minnesota ranges in size from pea-size to golf-ball sized hail. Larger hailstones have been reported but are much less common. Strong updrafts are usually associated with severe thunderstorms. The area covered by individual hailstorms is highly variable because of the changing nature of the cumulonimbus cloud. While almost all areas of southern Minnesota can expect some hail during the summer months, most hail is not large enough to cause significant crop or property damage.

Windstorms Windstorms can and do occur in all months of the year but the most severe windstorms usually occur during severe thunderstorms in the warm months. These include tornadoes and downburst or straight line winds. Winds of greater than 60 mph are also associated with intense winter, spring, and fall low-pressure systems. These inflict damage to buildings and in some cases overturn high profile vehicles.

Straight-line Winds A downburst is a severe, localized downdraft from a thunderstorm or a rain shower. This outflow of cool or colder air can create damaging winds. Winds up to 130 mph have been reported in the strongest thunderstorms. Downburst winds can cause as much damage as a small tornado and are frequently confused with tornadoes because of the extensive damage they cause. As these downburst winds spread out they are often referred to

as straight-line winds. They can cause major structural and tree damage over a relatively large area.

Strong winds combined with saturated soils can lead to wide spread loss of trees. This becomes a problem in communities when downed trees injure people, damage property, knock down power lines, or impede traffic. Downed power lines present a risk of electrocution or fire. Risks associated with downed trees can be managed through proper tree selection and proper maintenance programs. Some communities desire the look and feel of tree-shaded roads. This desire may lead a community to encourage the planting of trees that are too large for the boulevards, resulting in a greater risk of property damage.

History of Summer Storms in Yellow Medicine County

Yellow Medicine County has experienced all of the summer storms described above. Thunderstorms, hail storms, and windstorms are relatively common and can topple trees, cause destruction to homes, and destroy agriculture crops. Table 3.5 lists the number of summer storm events between 1955 and 2013 reported by the National Climatic Data Center. The average number of each type of events per year in Yellow Medicine County is also calculated.

Table 3.5 YMC Summer Storms from 1980 – 2013

	Thunder and Wind Storms	Lightning	Tornados	Hailstorms
	1980-2013	1980-2013	1980-2013	1980-2013
Events	56	1	19	74
Years	23	23	23	23
Average per year	2.43	0.04	0.83	3.22

Note: * Wind and thunderstorms of over 60 kts.

Source: National Climatic Data Center – Event Query 2014

According to the Storm Database, the county has experienced 17 tornados since 1955, as well as three funnel clouds. Of the nineteen tornados, nine were classified as F0, six were classified as F1, one was classified as F2, two classified as F3 and one classified as F4. Significant damage was done to Clarkfield from an F3 tornado and to Granite Falls from a F4 tornado. Many of the tornados occurred in rural areas and did little damage; however some of the destructive tornados destroyed farm buildings and downed trees. Straight line winds have also caused damage in Yellow Medicine County.

Granite Falls Tornado A destructive and deadly tornado struck the city of Granite Falls (Yellow Medicine County) on July 25, 2000. One person was killed, over a dozen injured, and millions of dollars of damage occurred to residences, businesses, and public facilities.

The tornado first touched down in rural Yellow Medicine County, eight miles west, and three miles north of Granite Falls. The tornado lifted before exiting Granite Falls, leaving a concentrated damage path two miles long, and 500 feet wide, through a primarily residential area of Granite Falls. Most of the damage in Granite Falls was caused by F2 to F3 wind speeds. However, this tornado was classified as a minimal F4 tornado, based on the twisted

wreckage of an overturned railroad car near the intersection of 9th Avenue and 14th Street in Granite Falls.

Clarkfield Tornado On June 16, 1992, a F3 tornado hit the southern part of Clarkfield turning one house completely upside down and ripping siding off many homes. During the late afternoon of the 16th, spotters were called out to watch for tornadoes and they called in to report a tornado touch down west of Clarkfield. This tornado damaged several buildings south and west of Clarkfield. The damage included several destroyed barns and buildings that were set back on the foundations.

Police Chief Hill had received notice that a second cell of activity could be approaching the city and could be expected around 11:00 p.m. The fire department was prepared to return to their spotting locations and watch for dangerous activity later that evening. While waiting for that cell to arrive, another cell of activity developed without warning. At 9:33 p.m. another tornado struck the city of Clarkfield. There had been no advance notice that anything was in the area and warnings had not been issued. The Police Chief immediately requested assistance and at that time, there was not a relay system to set off the sirens in Clarkfield. A firefighter attempted to activate emergency sirens at city hall, but there was no power. Without an emergency back-up system, the siren could not be utilized.

A flurry of activity began as power companies arrived to cut power to the downed lines. Neighboring fire departments arrived to assist the local fire department with their house-to-house search to make sure residents were safe. Emergency crews were surprised to find no one was seriously injured. Deputy Blackwelder arrived to assist with setting up an emergency center at city hall. When daylight arrived the next morning, people were finally able to view the devastation and begin the cleanup.

A majority of the homes and businesses in the city were damaged and emergency workers estimated \$7 million worth of damage was inflicted on the community. During the remainder of 1992 through 1993, \$2,350,000 worth of building permits were issued in the city of Clarkfield as residents worked to recover from the tornado damage.

Relationship to Other Hazards – Cascading Effects

Flooding Thunderstorms and heavy rain can cause flooding and property damage as well as disrupt emergency response, transportation, and communication.

Transportation, Emergency Services, and Utility Disruption Violent storms of all types can cause property damage, loss of life, personal injury, disrupt transportation, communication, and emergency services, and threaten public health and safety. Summer storms can present significant threats to essential public infrastructure and services such as power, water supply systems, and sanitary systems. Utility disruptions, in particular, are most likely to occur if a violent storm were to destroy an “electrical center” located in cities. It could take up to a full day to restore communication power, pending the service provider.

Fire The storms listed above could knock down power lines, which could lead to fires.

Violent Storms and Climate Change

Source: Minnesota State Hazard Mitigation Plan 2014

Winter Storms and Climate Change Winter storms have had a large impact on public safety in Minnesota historically. Snowstorm frequency and annual total snowfall have the potential to increase in the future. These events increase energy demand and pressure on the systems that provide energy that can result in power outages. As these events increase in the future there is a risk of reduced reliability in services, increased number of outages, and rising energy costs that can affect public health.

Climate change will likely have different effects on different geographical regions of the country as well as within the state of Minnesota. In the absence of downscaled modeling, more specific predictions for smaller geographical areas are not available at this time. Therefore, the climate change risks associated with Yellow Medicine County are not mutually exclusive, but rather the effects in the county may differ from those of the state and Midwest region.

Summer Storms and Climate Change

Lightning and Climate Change

According to the Draft National Climate Assessment (NCA), projections for the intensity and frequency of tornadoes, hail, and the damaging thunderstorm winds and the conditions associated with lightning are not certain (NCA, 2013, p. 26). The plan also stated that severe rain events are becoming more common and may include an additional risk of lightning.

Tornadoes and Climate Change

Tornadoes and other severe thunderstorm phenomena in the U.S. cause more deaths and similar amounts of annual property damage as hurricanes. Recent research has provided connections between global warming and the factors that cause tornadoes and severe thunderstorms. However, there is still a lot of research that has gone unexplored due to the challenges of observing these events and creating the computer models to simulate them (NCA, page 60).

Hail and Climate Change

The NCA reports uncertainty in predicting storm events associated with summer storms. However, during recent decades, the occurrence of very heavy precipitation has increased in Minnesota and it is predicted that this trend will continue into the future.

Windstorms and Climate Change

The NCA reported a slight increase of the frequency and intensity of winter storms and that the tracks of winter storms have shifted northward over the U.S. However, the lack of quality data sets makes assessment of these patterns difficult. Trends of storms remain uncertain and research will continue to investigate the connections between climate change and severe storms” (NCA, page 59).

Plans and Programs for all Severe Storms

Severe Storm Spotters Network This program, sponsored by the National Weather Service (NWS), enlists the help of trained volunteers to spot severe storm conditions and report information to the NWS. No tornado warning is given unless the storm has been spotted by someone or is confirmed by NWS radar reports. Yellow Medicine County has trained all fire departments, law enforcement and emergency management personnel in severe weather conditions. An additional 60 civilian severe weather spotters are trained and recertified each year and report directly to the NWS and the local dispatch when severe weather is observed.

Severe Weather Awareness Week Each spring Yellow Medicine County Emergency Management personnel conduct a severe weather-training workshop for schools, hospitals and nursing home personnel.

Severe Weather Shelters Most parks in Yellow Medicine County do not have safe shelters for severe weather. Timm Park with 22 campsites, north of Wood Lake, does not have a safe place for campers to go in the event of an emergency.

Windbreaks MnDOT and the Yellow Medicine County Soil and Water Conservation District have been promoting a living snow fence program. Strategically planted strips of trees, shrubs and/or native grasses can use natural snow fences to protect highways and dramatically reduce blowing and drifting snow. MnDOT has worked with the USDA to access CRP resources to help implement this program.

Live Weather Conditions All schools in the county have computer access to online weather radar.

Severe Weather Warning System Cities in the county have emergency sirens to warn residents in the event of severe weather. Yellow Medicine County dispatch center has its own radar to track weather. The system is very old and may need to be updated.

Publication “The Right Tree” Minnesota Power has published *The Right Tree*. This handbook can be useful in selecting proper trees - especially around power lines. Proper maintenance of trees can also prevent problems. DNR forestry staff, as well as private consultants, are available to work with communities to develop community forestry programs.

Hourly Data Hourly weather data is available online from various websites, including the MnDOT Website.

Gaps and Deficiencies

- There are homes in the county that lack basements that would provide shelter in the event of a tornado or damaging winds from a severe thunderstorm. Moreover, some of the county's nursing homes do not have basement shelters or other suitable shelter for residents. In the event of a violent storm, residents are moved to an interior hall away from windows.
- There may be areas beyond the broadcast range of the weather radio. It should be determined if additional towers are needed so that rural residents are not outside the range of the severe weather warning system sirens.
- Local radio stations do provide warnings but are effective only if tuned into by residents.

- Most power lines in the county are above ground and subject to damage from ice storms, wind and falling tree limbs. There are few community requirements that discourage the planting of large trees near power lines.
- In many communities, the local city hall is the emergency operations center. However, most are not able to access a backup power source.

Extreme Temperatures

Located in the center of the continent, Minnesota and Yellow Medicine County experience the extremes of summer heat and winter cold. Summer temperatures in Yellow Medicine County have been as high as 110° F on several occasions while winter temperatures have been as cold as 39° F below zero. Both heat and cold pose risks for people, animals, equipment, and infrastructure.

History of Summer Heat in Yellow Medicine County

The average July maximum temperature in most of Yellow Medicine County is about 85° F. July is the warmest month. On average the county experiences 23 days of 90 degrees or higher during a summer. The all-time recorded high is 111° F in Canby, which occurred in 1936 (Table 3.6).

Table 3.6 YMC Temperature Extremes

	Highest Temp	Date	Lowest Temp	Date
Canby	111°F	July 12, 1936	-33°F	January 22, 1936
Montevideo	110°F	July 31, 1988	-39°F	February 16, 1936

Source: Midwest Regional Climate Center 2014

While summers are typically warm but pleasant in Yellow Medicine County, it is not uncommon to experience high dew points and temperatures in the 90s for several days in a row. Extended periods of warm, humid weather can create significant risks for people, particularly the very young, those that are ill, and seniors who may lack air conditioning and proper insulation or ventilation in their homes. Animals are also at risk during extended periods of heat and humidity.

Heat Index has been developed as a measure that combines humidity and temperature to better reflect the risk of warm weather to people and animals. The index measures the apparent temperature in the shade. People exposed to the sun would experience an even higher apparent temperature. A heat index of 105° F is considered dangerous. With prolonged exposure, it could result in heat stroke, heat exhaustion, and heat cramps. People are reminded to use extreme caution when the heat index is between 90° F and 105° F. A heat index of 90° F occurs when the temperature is 90° F and the relative humidity is 50 percent. This is more of a problem when these conditions are present for several days in a row, allowing buildings to become hotter and hotter as the conditions persist.

According to the State Climatologist, there is some evidence that current dew points are not only higher but are occurring with greater frequency than in the past. If that is true, Yellow Medicine residents can expect an increasing number of hours with dangerous heat index levels.

History of Winter Cold in Yellow Medicine County

On average, January is the coldest month, with daytime highs of averaging 24° F and nighttime lows of 5° F. Table 3.6 shows the lowest temperatures reached in Yellow Medicine County. However, these averages do not tell the entire story. Maximum temperatures in January have been as high as 67° F and minimums as low as -39° F below in Yellow Medicine County. The winter months on average produce about 34 days of 0° F or lower.

Cold weather is often accompanied by winds creating a dangerous wind chill effect, putting both people and livestock at risk. Most of the county is at risk of this kind of weather because of its relatively flat, open character. More wooded, hilly areas of the county are less severely affected by wind chill. Wind chills of -35° F and lower can present significant risk, particularly if people are not properly clothed or protected. A -15° F air temperature with wind speeds of 10 miles per hour creates a wind chill of -35° F. Under these conditions, frostbite can occur in just minutes on exposed skin.

Relationship to Other Hazards – Cascading Effects

Violent Storms Temperature extremes are often associated with weather extremes such as snowstorms and blizzards.

Drought Extended high temperature extremes can phase into drought.

Wildfire Dry, hot conditions can increase the risk of wildfires.

Collapsed Structures Structural weakness results from building material failure, settling, and other factors. Tornadoes, floods, high winds, snow, heavy rainfall, may cause major damage to structures.

Utility Failure Heavy utility use to heat or cool buildings can cause utility damage or failure.

Extreme Temperatures and Climate Change

Source: Minnesota State Hazard Mitigation Plan 2014

The average temperature in Minnesota has increased more than 1.5° F since recordkeeping began in 1895 and that increased warming has been occurring in recent decades (Interagency Climate Adaptation Team, p. 4). Midwest annual temperatures have generally been well above the 1901-1960 average since the late 1990s. The warmest decade on record occurred during the 2000s (Kunkel, K.E. et al, 2013). In addition, the Midwest has experienced major heat waves and their frequency has increased over the last six decades (Perera et al. 2012). In the U.S., mortality rates increase 4% on days with heat waves in comparison with non-heat wave days (Anderson and Bell 2011). It's been projected that heat stress will increase as summer temperatures and humidity continue to increase (Schoof, 2012).

In regards to extreme cold temperatures, the Minnesota State Hazard Mitigation Plan 2014 states that there is not yet any observable trend related to extreme cold events and climate change in Minnesota. Historically, cold temperatures have always been a part of Minnesota's climate and extreme cold events will continue. However, an increase in extreme precipitation or ice storms due to climate changes could lead to a higher risk of exposure to cold temperatures during power outages or other storm-related hazards during extreme cold.

The state hazard mitigation plan also notes that climate change will likely have different effects on different geographical regions of the country as well as within the state of Minnesota. In the absence of downscaled modeling, more specific predictions for smaller geographical areas are not available at this time. Therefore, the climate change risks associated with Yellow Medicine County are not mutually exclusive, but rather the effects in the county may differ from those of the state and Midwest region.

Plans and Programs for Extreme Temperatures

The following programs and projects are in addition to the ones already mentioned for violent storms:

School Closings The county's school districts each have their own school closing policy. The superintendents decide when to send students home based on current weather forecasts. Local radio stations partner with the districts to make sure school closure announcements are out by 6:00 a.m. or earlier.

Heat Advisories The local radio and TV media in concert with the National Weather Service issues a heat advisory when the combination of temperature and humidity create risks for people and animals. A heat index of 105° F to 114° F warrants a heat advisory. This occurs when air temperature reaches 95° F and the relative humidity is 50 percent. An excessive heat warning is issued when the heat index reaches 115° F. This occurs with an air temperature of 95° F and relative humidity of 60 percent. An index of 115° F or higher creates severe risk for both humans and animals.

Wind Chill Warnings The local radio and TV media collaborate with the National Weather Service and issue wind chill warnings when temperatures are 30° F or below. Severe wind chill warnings are provided when conditions warrant and when severe risk and safety is a factor. Wind chills of -40° F or lower frequently prompt the closing of schools to protect children, particularly those that might have to wait outside for extended periods of time.

Hourly Data Granite Falls Airport has an Automated Weather Advisory Station (AWAS) in place as of October 2003.

Program Gaps or Deficiencies for Extreme Temperatures

- Some of the schools in the district have an automated weather station providing current weather conditions. Additional stations at schools throughout the county would provide more current information and quicker response to dangerous and changing weather conditions.

Flooding

A flood is defined as an overflowing of water onto an area of land that is normally dry. For floodplain management purposes, the Federal Emergency Management Agency (FEMA) uses the following definition of "100-year or 1 percent flood." Other water hazards considered in this section include flash floods and washouts.

The term "100-year flood" is the annual one percent chance that water levels will reach or exceed a defined flood elevation threshold. Thus, a 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. A structure located within a special flood hazard area shown on a map has a 26 percent chance of suffering flood damage during the term of a 30-year mortgage. One-hundred year floodplains have been

identified, mapped and used for further analysis using the county's Geographic Information Systems (GIS).

Floods generally occur from natural causes, usually weather-related, such as a sudden snowmelt, often in conjunction with a wet or rainy spring or with sudden and very heavy rain falls. Flood can also result from human causes such as a dam impoundment bursting. Other water-related hazards include wash-outs and ice freezes that affect dams and culverts. In the spring of 2009, a great amount of water overflowed roads, causing a major washout and road closures throughout the county.

History of Flooding in Yellow Medicine County

Flooding in the county occurs primarily in the spring during periods of peak conditions (rainfall and snowmelt) and in areas where the soil has low permeability qualities. Damages are mainly confined to the Yellow Medicine and Lac qui Parle watersheds. According to estimates by the U.S. Army Corp of Engineers and Soil Conservation Service, there are approximately 27,657 acres in the 100-year floodplain within the Lac qui Parle and Yellow Medicine watersheds. Within the Lac qui Parle watershed, average annual damages resulting from flooding amount to about \$390,030. In the Yellow Medicine River watershed, annual damages amount to about \$471,080. These figures were determined using 1985 cost-benefit figures and are not adjusted for inflation. Therefore, the damage figures given do not reflect current damage costs and are undervalued.

In Yellow Medicine County, there are large flood plains associated with the confluence of Canby and Lazarus Creeks, and the confluence of Spring Creek and the Yellow Medicine River. It would be appropriate to evaluate flood risk for these areas. The MnDNR strongly encourages relocation of homes and retirement of farmland within the floodplain.

Granite Falls Flood History.

Source: Granite Falls Flood Mitigation Plan 2001

Floods on the Minnesota River at Granite Falls occur mostly in the spring from snowmelt runoff. Low level flooding (considered as events with estimated frequency between 10 and 25 years) impact areas directly adjacent to the main river channel. Flood fighting efforts for low level events is based more on individual than community-wide efforts. At flood stage (approximately 25-year frequency event), river flows are split between the main river channel and a secondary river channel along the western and southern edge of the city.

The flood of record on the Minnesota River at Granite Falls occurred in April 1997. This flood had a peak discharge of approximately 53,000 cubic feet per second (cfs) at Granite Falls. This was measured at the Minnesota Falls Dam, located on the Minnesota River approximately 2.7 miles below the confluence of the secondary channel and the main river channel. The distribution of flows were estimated at 40,000 cfs in the main channel and 13,000 cfs in the secondary channel. A similar event occurred in the spring of 2001. While not reaching the same levels as the 1997 event, the magnitude on flows and impact to the community were similar.

Flood fighting efforts in the Granite Falls area during the last two floods consisted of hundreds of volunteers filling hundreds of thousands of sandbags and building sandbag levees around homes and businesses. Many agencies were involved in the previous two flood fights including

the US Army Corps of Engineers, Minnesota National Guard, National Weather Service, US Geological Service (USGS), Minnesota Department of Transportation (MnDOT), and state, county and local officials. Flood fighting itself carries significant risks for the volunteers. Levee heights reach as high as ten feet. Volunteers worked day and night adjacent to the flooded Minnesota River, flowing at dangerous levels, with very fast velocities of eight to ten feet per second (12 to 15 mph), and at a water temperature just above freezing. In 2001, a total of 620,000 sandbags were filled and placed with volunteer labor, with 550,000 sandbags used to construct levees.

In 1997, the city spent \$852,086 for flood fighting efforts and cleanup (cost figures provided by city staff). Over \$175,000 was spent by the US Corps of Engineers in construction contracts to fight the floods in 1997. An estimated \$3.1 million was prevented from damage from the 1997 flood due to flood fighting activities. In 2001, the city spent \$437,115 for flood fighting efforts and cleanup (cost figures provided by city staff). The US Corps of Engineers awarded temporary levee construction contracts in 2001 totaling \$112,250 for Granite Falls. Other large floods occurred in April 1952 (25,300 cfs), April 1969 (43,000 cfs), and April 2001 (cfs uncertain but likely between 34,600 and 43,000). Significant flood events occurred in June 1919, April 1951, April 1965, and March 1994. It should be noted that ice flow or frazzle ice have exacerbated flooding impacts in the city on some occasions during spring flows.

Flood fighting efforts as a result of flooding over the past four years has cost hundreds of thousands of dollars, extensive property damages, economic hardship, and has carried a significant risk for the volunteers involved in the flood fighting efforts. In 1997 and 2001, Granite Falls experienced floods, residential property damage and the forced evacuation of people from their homes. The total private property damages for the 2001 floods, based on estimates by the county assessor's office, were in excess of \$150,000. Damage to public structures amounted to \$1.5 million.

Figure 3.1 NCDC & DNR Flood Summaries

**Flooding Reports from the
National Climatic Data Center
(NCDC) Storm Event Database**

<http://www4.ncdc.noaa.gov/cgi-win/wwwcgi.dll?wwevent~storms>

Flash Flood, August 20, 2002

Nearly seven inches of rain fell in extreme northeastern Yellow Medicine County, on the southern outskirts of Montevideo. Three roads were flooded with two to three feet of water, and a few basements were flooded.

**DNR Waters Summary on Climatic Conditions that led to the
1997 and 2001 flooding**

See Appendixes 3 & 4 for complete report

1997 Flood Factors

- 1) Heavy autumn precipitation
- 2) Extraordinary winter snowfall
- 3) Less than ideal snowmelt scenario
- 4) Heavy early spring Precipitation

2001 Flood Factors

- 1) Significant autumn precipitation
- 2) Heavy Winter snowfall
- 3) Less than ideal snowmelt scenario
- 4) Record-breaking April precipitation

Figure 3.2 NCDC 1997 & 2001 Flood Reports

Flooding Reports from the National Climatic Data Center (NCDC) Storm Event Database

<http://www4.ncdc.noaa.gov/cgi-win/wwcgl.dll?wwevent~storms>

100-year flood in 1997

Above normal temperatures during the last week of March began melting a deep snow cover across much of west central into parts of central Minnesota. Snow depth rank was in the 80 to 90th percentile over the area as measured on 3/20/97. The snow cover had high moisture content. In addition, several storms deposited additional rain and snow over the area on 3/24/97 and 4/5/97. The flooding resulted in severe losses to both public and private property. Damage was extensive to roads, bridges, culverts, agricultural drainage areas, homes and businesses. Drainage ditches and culverts plugged with snow and ice resulted in sporadic flooding. Scattered road closures were a result of the spring thaw as well. Many smaller rivers also overflowed their banks resulting in road closures and structural flooding.

The river remained above flood stage until mid-May. Flood stage of the river in Montevideo was 14 feet which was reached on 4/2/97. The river crested at 23.9 feet on 4/7/97 establishing a new record crest in Montevideo. Other monitoring points along the Minnesota River reached crests that were at 3rd or 4th all-time record levels, including Mankato, Henderson, Jordan, Shakopee and Savage.

Minnesota River flooding resulted in severe losses to public and private property. An early spring storm brought heavy rain, snow and high winds to the area on 4/5-6/97 at the peak of the flooding, severely aggravating the situation. Many roads were closed in the Montevideo and Granite Falls areas. Firefly Creek Casino closed due to lack of road access. Yellow Medicine County museum flooded on 4/5/97. Sanitary sewer lift station failed in Montevideo causing sewage backup into homes. Four hundred residents were evacuated. Up to 150 homes in Montevideo reported flooding to some degree. Sewer backups also reported in Watson and Clarkfield. Highway 212 bridge collapsed west of Granite Falls.

More than 60 homes evacuated in Granite Falls. Flood waters knocked out Granite Falls' water treatment plant, forcing water rationing. Schools were closed in districts close to the Minnesota River. At one point, only one bridge (Highway 4 in Fairfax) spanning the Minnesota River was still open between Mankato and the South Dakota border.

The Minnesota River remained in flood stage through mid-May. The river first went above flood stage in late March. Peak crests of the river were reached during the first two weeks of April. The crest at Montevideo reached 23.9 feet on 4/7/97 which set a new record crest. Minnesota River flooding resulted in severe losses to public and private property.

100-year flood in 2001

Heavy snowfall during winter remained on the ground through the end of March and then rapidly melted, resulting in river stages close to record levels. Water began to gush through drainage ditches, streams and into the mainstream rivers during mid-day April 1. Heavy rain April 7-8 over much of central Minnesota prolonged the high water and also added one or two feet to many crests during mid-April. Another period of heavy rain April 22-23 caused rivers to crest again in late April and early May; in some cases the crest was higher than the first. Many rivers remained well above flood stage into mid-May. The crest at Montevideo on the Minnesota River was the second highest ever; only 1.3 feet lower than in 1997.

Numerous roads and bridges were closed millions of sandbags used, and approximately 200 homes and businesses were partially submerged with flood waters. About 100 homes and businesses were damaged beyond repair.

Snowmelt flooding that began April 1 continued into early May on the major rivers: the Minnesota, St. Croix, Crow River, South Fork of the Crow River, and the Mississippi River below its confluence with the Minnesota River. The last of the river levels finally went below warning criteria on May 8.

**For more information on issues, changes, and future concerns related to these flood events, see Appendices 5-7.*

2014 Flooding

In 2014, Minnesota Governor Dayton declared a state of emergency due to flooding in 35 counties across the state, including Yellow Medicine County. For many areas of the state, the first half of 2014 had the highest precipitation totals on record. The flooding caused major problems for crops, cattle, homes, buildings, and infrastructure. The Minnesota River in Montevideo (Chippewa County) rose to over 17.45 feet, about 3.5 feet above flood level.

Granite Falls received nearly 18 inches of precipitation in May and June alone. If flood mitigation projects had not been completed, residents could have seen effects reminiscent of the 1997 flooding. The flood mitigation projects completed in Granite Falls during the past 10 years have proven to be very effective and a large amount of potential damage was avoided.

Relationship with Other Hazards – Cascading Effects

Hazardous Materials Structures that house hazardous materials may be flooded causing leaks or transportation routes may be washed out, causing overturned vehicles.

Infectious Disease Water issues often translate into issues around infectious diseases. Water contamination and wastewater removal many times go along with flooding issues. Diseases such as hepatitis A, Giardia, cryptosporidium, and West Nile virus are potential hazards that have direct links to water.

Transportation, Emergency Services, and Utility Disruption Violent storms of all types can cause property damage, loss of life, personal injury, disrupt transportation and communication and emergency services and threaten public health and safety and be significant threats to essential public infrastructure and services such as power, water supply systems and sanitary systems.

Landslide and Debris Flow There were issues with debris flow and bridge damage in the floods of 1997 and 2001. It was difficult to keep the rivers and drainage ditches clear and therefore backup of floodwaters occurred.

Destabilized stream banks are related to flooding. As rivers evolve they carve out a channel adequate to handle typical peak flows (1-2 year flood events). As landscape hydrology alters, higher peak flows carve out larger channels. Unfortunately, this often results in riverbanks being destabilized. Across the region these unstable banks have threatened farmlands, roads and homes. Bank stabilization projects are expensive and often only shift the problem to a different place along the stream. Long term mitigation for riverbank stabilization is 1) holding water on the landscape and 2) proper setback of infrastructure and building from rivers.

Debris flow includes downed trees being carried by floodwaters. These trees caused problems at various bridges over the Minnesota River in the last round of major flooding. The trees ran into bridges and got caught forming logjams. Contractors lifted the trees over bridges and returned them to the river downstream of the bridge, with the end result of trees floating to succeeding bridges to be lifted over again. Large flood events can and do kill trees within the flood plain, including large cottonwood and maples. In subsequent flood events these standing dead trees can be knocked down and washed away, causing havoc to communities and counties.

Floods and Climate Change

Source: Minnesota State Hazard Mitigation Plan 2014

The change in precipitation amounts have led to an increased magnitude of flooding. In conjunction with increased precipitation, seasonal changes have occurred with trends of wetter springs and drier summers and falls.

Plans and Programs for Floods

County Flood Area Map and Controls The 100-year flood area are shown in the Hazus Analysis in Chapter 4 (page 18). The county zoning ordinance controls the permitted land uses in these areas which describes what can be built and how [refer to Yellow Medicine County Land and Related Resource Management Ordinance].

Granite Falls Flood Map and Control Granite Falls has identified 100-year flood areas on its official land use map and adopted in its zoning ordinance a floodplain ordinance which identifies appropriate zoning and land use controls. The 100-year flood areas for Granite Falls are found in Chapter 2 (page 24).

Operations Center The emergency operations center for the county is now located in the basement of the new Law Enforcement Center located in Granite Falls, MN.

Program Gaps or Deficiencies for Floods

- DNR forestry staff suggest that the costs and hazard associated with downed trees as debris flow might be mitigated through improved “sanitation cutting” in the floodplain. There are provisions within the Reinvest in Minnesota (RIM) set aside program that allows limited timber cutting on lands enrolled in the program. However, the cutting must be allowed in a timber management plan prepared by a DNR Forester. Soil and Water Conservation Districts and landowners have not been utilizing this aspect of the RIM program.
- Some county roads, including 266th Avenue, have been completely submerged when the MN River rises above the river bank.

Erosion

Erosion is the gradual wearing-away of land surface materials, especially rocks, sediments, and soils, by the action of water, wind, or a glacier. Usually erosion also involves the transfer or eroded material from one place to another (The American Heritage Dictionary of Student Science). Erosion can occur on farmland, stream banks, bluffs, and coastlines and can be the result of both natural and man-made activities.

History of Erosion in Yellow Medicine County

According to the Yellow Medicine County Water Plan (2005), Yellow Medicine County soils are subject to both water and wind erosion. Water erosion results from soil removed from its original location by the force of water to lower slopes and plots. The potential for wind erosion occurs when wind velocities exceed 12 mph. The Yellow Medicine County Water Plan states that 50% of the cropland in Yellow Medicine County is prone to excessive water erosion and that 25% has the potential for severe wind erosion. The Yellow Medicine County Comprehensive Local Water Plan Update (2010) still lists erosion and sediment control as the second highest priority issue for the county. For additional information, refer to the Yellow Medicine County Water Plan (2005).

Erosion and Climate Change

The Minnesota State Hazard Mitigation Plan 2014 states that flash flooding can contribute to erosion of stream banks. Impervious surfaces from human development as well as the predicted increases in heavy rain events in the future may contribute to flash flooding leading to erosion for stream and river banks in Yellow Medicine County.

Plans and Programs for Erosion

Yellow Medicine County Comprehensive Local Water Plan (2010) The Yellow Medicine County Comprehensive Local Water Plan Update (2010) still lists erosion and sediment control as the second highest priority issue for the county. The plan provides 12 action steps for best management practices to address soil and stream bank erosion in Yellow Medicine County.

Program Gaps or Deficiencies for Erosion

- There is an overall lack of knowledge on the effects erosion could potentially have on the ditch system in Yellow Medicine County.

Drought

Drought is defined as a prolonged period of dry weather or a lack of rainfall.

History of Drought in Yellow Medicine County

Yellow Medicine County has experienced prolonged periods without rainfall. The most severe in climatic records occurred during the 1930s. There has not been a drought equal in comparison since.

Record low precipitation for the summer in Canby was 2.95 inches in 1950 and in Montevideo, 3.46 inches in 1976. Record low for the month of July in Canby was .13 in 1947 and in Montevideo, 0.12 inches in 1936. Annual record low rainfall for both Canby and Montevideo was in 1976 and was 9.01 and 13.08 respectively.

Granite Falls receives its drinking water supply from the Minnesota River. In 1988, Granite Falls requested to hold back more water in order to prevent a shortage. This request was denied.

Individual shallow wells in the Granite Falls area have occasionally failed, requiring the affected parties to re-drill into reliable aquifers. The wells for the City of Granite Falls are not adequate and new sources are being explored.

Drought also gives way to insect infestation. Grasshoppers were abundant during the 1988 drought.

Drought of 1920's & 1930's Perhaps the most devastating weather-driven events in American history were the droughts of the 1920's and 1930's, which significantly impacted Minnesota's economic, social, and natural landscapes. Abnormally dry and hot weather during the growing season throughout the better part of two decades turned Minnesota farm fields to dust and small lakes into muddy ponds. The parched soil was easily taken up by strong winds, often turning day into night. The drought peaked with the heat of the summer of 1936, setting many high temperature records that still stand today.

Drought of 1974-77 Drought-like conditions began in the winter of 1974 and extended through the summer of 1977. The dry conditions of these years lowered water levels in wells and caused record low stream flows throughout the state. Late summer forest fires broke out, and conflicts arose between domestic well owners and neighboring high capacity well owners. The DNR Division of Waters formulated new policies to resolve these resource management problems and user conflicts. Many of these new policies formed the basis of subsequent amendments to agency rules and state statutes.

Drought of 1987-89 The warm, dry winter of 1986-87 was the beginning of this period of little rainfall and extreme dryness. Drought conditions became very serious in mid-June 1988 when Mississippi River flow levels threatened to drop below the Minneapolis Water Works intake pipes at the city of Fridley. Below normal precipitation coupled with declining lake levels, ground water levels, and stream flow to create statewide concern. To facilitate coordination of drought response actions, a State Drought Task Force was convened by the director of the Division of Waters. The State Drought Task Force brought together local, state, and federal officials to share information and coordinate drought response strategies. Several actions were taken following the summer of 1988 to better prepare the state for the next drought. Minnesota

Governor Rudy Perpich appointed a "Twin Cities Water Supply Task Force" specifically to make recommendations on how to meet future water demands in the event of low flow conditions on the Mississippi River. The Corps of Engineers initiated review of its operating plans for the Mississippi River headwaters reservoirs, and the 1989 legislature charged the Metropolitan Council with preparing water use and supply plans for the metropolitan area. In the summer of 1988, rains finally came in August, but not soon enough to save agriculture crops.

Drought of 2003 For a three-month period from mid-July through mid-October, a stubbornly persistent weather pattern resulted in extremely dry weather across the state of Minnesota. Few widespread rain events moved through the state during this time period and precipitation totals were less than six inches across much of Minnesota. Total rainfall for the mid-July through mid-October period fell short of historical averages by four or more inches in many areas. Rainfall deficits exceeded seven inches in parts of southeastern Minnesota. When compared with other July 15 through October 20 time periods in the historical database, mid-July through mid-October 2003 rainfall totals rank among the lowest on record for many areas of south central and southeastern Minnesota, as well as a small portion of west central Minnesota.

Yellow Medicine County traditionally sees "Abnormally Dry" weather with pre-drought conditions annually. Between 2000 and 2010, three droughts occurred countywide. The first took place from September 2003 to June of 2004 categorized as a "Moderate Drought", followed by another "Moderate Drought" from the end of July 2006 to end of August 2006. The final drought occurrence varied between a "Moderate Drought/Severe Drought" from the end of July 2007 to mid-September 2007.

Relationship with Other Hazards – Cascading Effects

Wildfires Woods, brush land, and non-cultivated fields stressed by drought, significantly increases the risks of wildfire.

Drought and Climate Change

Source: Minnesota State Hazard Mitigation Plan 2014

Drought events have occurred throughout Minnesota's history. However, the Minnesota State Hazard Mitigation Plan 2014 reports that the impact of climate change on droughts is uncertain. During the past century there was no change that occurred for the duration of droughts in the Midwest, but the average number of days without precipitation is anticipated to increase in the future. In addition, the projection of higher air temperatures can cause increases in surface evaporation and water loss from plants. This could lead to drier soils where the sun heats the soil and the adjacent air instead of moisture with the result of hotter summers and drier climatic conditions.

Plans and Programs for Drought

Water Plan The current Yellow Medicine County Comprehensive Water Plan identifies major and minor watersheds serving the county.

Water Consumption Semiannual or annual water consumption by various major consumers, urban residential, industrial/commercial or agricultural, is documented through water meters.

Program Gaps and Deficiencies for Droughts

- County has no estimates of annual recharge rates or the capacities of the various aquifers.
- Semiannual or annual water consumption by various major consumers, urban residential, industrial/commercial or agricultural, is not documented or known.
- Water conservation provisions and use restrictions in times of drought are not included in the county ordinance or in all city ordinances.
- The current county water plan recommends wellhead protection standards for adoption via ordinance by Yellow Medicine County, but has yet to be implemented. Lincoln-Pipestone is currently working on a rural Water Burr Well Field Wellhead Protection program.

Wildfire

A wildfire is an uncontrolled fire spread through vegetative fuels, posing danger and destruction to property. Wildfires can occur in undeveloped areas and spread to urban areas where structures and other human development are more concentrated. While some wildfires are started by natural causes such as lightning, humans cause four out of every five wildfires. Burning debris, arson, and carelessness are the leading causes of wildfires. As a natural hazard, a wildfire is often the direct result of a lightning strike that may destroy personal property and public land areas, especially on state and national forest lands. The greatest risks of wildfires are the destruction of timber, property, wildlife, and injury or loss of life to people living in or using the area for recreational activities.

Wildfire risks are not limited to public lands. There are extensive tracts of privately owned grasslands as well. These include both conservation program lands (CRP, RIM, CREP, etc.) and “rough ground” that has been hayed, pastured, or left wild. These private lands particularly in combination with public lands (such as WMA, SNA, State Parks, WPA, etc.) can combine to create substantial blocks of grasslands.

To date, there has been very little injury or loss of property resulting from wildfire in the Upper Minnesota Valley Region. However, there are some risks that should be managed to mitigate potential disasters.

History of Wildfires in Yellow Medicine County

Wildfires occur throughout the state of Minnesota. According to the Minnesota State Fire Marshal, there are more than 2,000 annual wildfires with an estimated loss of more than \$13 million dollars.

Yearly occurrences of wildfires are started along the railroads and farmland. Two other potential wildfire hazards are along timber bridges and power lines and utility structures. The hot exhaust from farm equipment can also start fields on fire.

Wildfire behavior is based on three primary factors: fuel, topography and weather. When dry weather mixes with windy conditions, areas with fuel have the potential for a wildfire to spread out of control as it did in the 2003 fire near Milan. Yellow Medicine County currently has 24,722 acres enrolled in CREP, RIM, CRP and the Wetland Reserve Program. These areas are left for wildlife habitat and are not burned on a regular basis. As a result, years of dead grasses accumulate on these lands and are a good fuel for any fire that may start. The Minnesota River Valley and the Wildlife Management Areas also provide an abundance of fuel for wildfires. Wildlife Management Areas occupy approximately 12,000 acres in Yellow Medicine County. Starting in 2003, all new CRP contracts require mid-management during the life of the contract which could include a prescribed burn, mowing, etc. With CRP and/or CREP, landowners can request a firebreak between their CRP field and the landowner’s farmstead.

Topography is important in determining wildfire potential, as it affects the movement of air and fire over the ground surface. The slope and shape of terrain can change the rate of speed at which the fire travels and the majority of Yellow Medicine County is relatively flat. The Yellow Medicine River Valley has some defined slope, while the Minnesota River Valley is wide around Lac qui Parle Lake and has a more defined slope below the Lac qui Parle Dam.

Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind affect the severity and duration of wildfires. These conditions are similar throughout the county. Although higher wind speeds are possible in the northern portion of the county due to the lack of vegetation and slope, the area is dominated by agricultural uses and lacks major stands of forests.

Relationship with Other Hazards – Cascading Effects

Flooding and Erosion Major wildfires can completely destroy ground cover which can cause heavy erosion and loss of all vegetation. If heavy rains follow a major fire, flash floods, landslides and mudflows can occur since vegetation is essential in deterring flooding during heavy rainfalls or spring runoff.

Hazardous Materials Anhydrous ammonia tanks that sit in the countryside or on farms are at risk if a wildfire occurred. While most tanks can be moved quickly, fire departments and response teams may not be aware of their presence.

Wildfires and Climate Change

Source: Minnesota State Hazard Mitigation Plan 2014

On a global scale, fire risk will increase by 10-30% because of higher summer temperatures. The Minnesota Forest Ecosystem Vulnerability Assessment and Synthesis by the U.S.D.A. Forest Service and Northern Institute of Applied Climate Science report that national and global studies agree wildfire risk will increase in the region, however there are a lack of studies that specifically address wildfire potential in assessment areas.

Droughts and drought fires have occurred throughout the history of Minnesota. No change has been found in the duration of Midwest droughts during the past century, but the average number of days without rain is predicted to increase along with temperatures. As a result, extreme heat events and associated wildfire risks are predicted to become more prevalent.

In addition, the increase of the fluctuations between drought, extreme rain events, and the increase in temperature will lead to changes in forest composition and distribution. These changes also will contribute to drier conditions that may cause increased fire risk as well.

Plans and Programs for Wildfires

Fire Districts and Departments Fire departments respond to any structure fires that are in their fire district and help when needed in other districts (West Central Firefighters Association) and often work together on large fires. All the Fire Departments in the county are on the city level and are a part of the West Central Firefighters Association (includes 9 surrounding counties and 44 fire departments).

West Central Firefighters Association Fire departments that are members of the West Central Firefighters Association agree to make their fire-fighting equipment and personnel available to each other in the case of emergencies. Each department has the legal authority to send its fire-fighting equipment and personnel into other communities.

Zoning The Yellow Medicine County Zoning department regulates the development of new housing. The department is also in charge of enforcing safety restrictions including setbacks, lot coverage, lot depth, and structure height. The fire marshal inspects commercial structures for potential fire hazards.

DNR Training Firefighters participate in annual wildfire training classes offered by the Minnesota Department of Natural Resources, Forestry Department.

State Land Management The DNR operates and regulates all state lands within the county. Parks are currently managed predominantly for recreational activities. Wildfires are minimized by thinning brush and vegetation around the parks, particularly around the campground areas.

FireWise The DNR participates in a national wildfire education program called FireWise. This program provides tools for risk assessment and risk reduction and is available to communities who would like to do a detailed risk assessment. Small grants are available for 50 percent of projects.

Education and Outreach Education is available through existing resources and channels such as the Extension Service and Soil and Water Conservation Districts. Countryside Public Health assists the DNR to provide health information for the public.

Evacuation Plan The county's cities have evacuation plans delineating routes residents should take in the event of large fires and other emergencies.

Program Gaps or Deficiencies for Wildfires

- Currently the county zoning lacks regulations regarding vegetation on property. One of the problems with past fires is the undergrowth and overhanging trees near residential structures. Although aesthetically appealing, vegetation around homes has destroyed numerous dwellings in past fires.
- There is currently no program to ensure that fire is considered when planning conservation plantings that include woody cover. Firebreaks should be included to protect homes and woody cover as well as allowing the use of fire as a management tool. (If a tree and shrub planting is placed in the middle of a prairie planting, it may be difficult to accomplish a prescribed management burn of that property without damaging or destroying the woody component. It may also be impossible to protect that planting in the event of a wildfire.)

Dam Failure

Dam failure is defined as the collapse or failure of an impoundment resulting in downstream flooding. Dam failures can cause loss of life and extensive property damages. These losses can result from an array of situations, including flood events, poor operation, lack of maintenance and repair, and terrorism.

The main purpose of dams is to hold water, which is important during high water or floods, especially during spring runoff and immediately after heavy rains. Although dams act to prevent harm from flooding, they do pose potential threats in the event of failure. Dam failure can push a wall of water down to the valley below, causing serious destruction in its path.

The Lac qui Parle Dam is a "Low Head Dam" which means that if it failed, it is not life threatening to Granite Falls or Montevideo. A dam failure model for the "Probable Maximum Flood" showed travel time from the dam to Montevideo to be approximately six to seven hours. A dam failure during an event this large would only raise water stages in Montevideo by less than half a foot. For a "Normal High Pool" failure, the impact at Montevideo would be about five feet. The impacts at Granite Falls are very similar.

The Granite Falls Dam is a "High Hazard Dam", which means there is potential for loss of human life if failure of the dam should occur. A dam break analysis was performed and was filed with the appropriate state and federal regulatory agencies. Maximum "Sunny Day Failure" was 5.2 feet with a stage increase of one foot or more between Granite Falls Dam and Minnesota Falls Dam (no longer exists). For a dam break at a 15-year event, stage increases were 2.0 feet or less.

The Del Clarke Dam near Canby is owned and maintained by the Lac qui Parle – Yellow Bank Watershed District and has a spillway for flood events. The Watershed works with the US Army Corps of Engineers and the DNR to comply with all regulations and permits. An emergency contingency plan is in place and is updated annually.

Lazarus Creek, a tributary to the Lac qui Parle River, drains into the Minnesota River and is home to the Lazarus Creek Floodwater Control Project completed in 2005. The purpose of the project was to control runoff from a 21.2 square mile drainage area west of Canby, Minnesota by creating an earthen dam at 62 feet in height and 1,350 feet in length. The site also includes a vegetated earthen emergency spillway to prevent dam overtopping, thus creating a "dry dam" that can store approximately 1,950 acre-feet of runoff from 100-year storm events.

The U.S. Corps of Engineers operates and maintains day use recreation areas below Lac qui Parle and Marsh Lake dams. Facilities consist of picnic areas, playground, privies, bank fishing, and drinking water.

History of Dam Failure for Yellow Medicine County

The worst recorded dam failure in U.S. history occurred in Johnstown, Pennsylvania, in 1889. More than 2,200 people were killed when a dam failed, sending a huge wall of water downstream, completely destroying the town below. Although risks are minimal, dam failure can occur in Minnesota. Several dam failures have occurred in Minnesota in the past, but none have been reported in Yellow Medicine County.

Relations with Other Hazards – Cascading Effects

Flood Dam failure, although the risk is minimal, has the potential to be devastating to the areas within the floodplain and around the stream directly below the dam in Montevideo and Granite Falls. If the Lac qui Parle Dam were to fail, Montevideo and Granite Falls would be impacted. Dam failure would cause immediate flash flooding, destruction of property, erosion of crops, and the potential destruction of infrastructure.

Dam Failure and Climate Change

Source: Minnesota State Hazard Mitigation Plan 2014

Dams are designed based on assumptions about a river's annual flow behavior. These assumptions will determine the volume of water behind the dam and the amount of water flowing through the dam at any one time. Changes in weather patterns due to climate change may change the hydrograph, or expected flow pattern.

Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events are a mechanism that also results in increased discharges downstream. It is conceivable that bigger rainfalls at earlier times in the year could threaten a dam's designed margin of safety, causing dam operators to release greater volumes of water earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream.

While climate change will not increase the probability of catastrophic dam failure, it may increase the probability of design failures. Climate change is adding a new level of uncertainty that needs to be considered with respect to assumptions made during the dam construction.

Plans and Programs for Dam Failure

Floodplain Ordinance The county floodplain ordinance prohibits further development on the properties in the floodplain, including property directly below the dam. The Granite Falls ordinance prohibits further development in the floodplain in the City of Granite Falls.

Infrastructure Plan The county infrastructure plan prohibits further development on the properties adjacent to the dam, including property directly below the dam. Yellow Medicine County has dedicated land adjacent and below the dam as public open space.

Dam Inspection The Minnesota Department of Natural Resources regulates nearly 900 of the numerous dams in the state. The DNR and US Army Corps of Engineers regularly inspect the dam and reservoir capabilities for flooding and dam failure. Their report indicates that the size of the dam is adequate for any major floods or spring runoff. Del Clarke Dam and other dams constructed by federal government and Lac qui Parle Watershed District are inspected annually by the NRCS, Lac qui Parle Watershed District, Yellow Medicine SWCD and Area II. All large dams constructed by the federal government and the Yellow Medicine Watershed District are also inspected annually.

Monitoring The county does some monitoring of tributaries emptying into the reservoir to help identify large volumes of water in times of flooding. This is completed by watershed projects.

Evacuation Plan The county has an identified evacuation plan for all cities in Yellow Medicine County.

Contingency Plan There is a contingency plan in place in case of dam failure for both the dam in Granite Falls and the Del Clarke Dam near Canby

Program Gaps or Deficiencies for Dam Failure

- Property around the Granite Falls dam is owned by the city of Granite Falls and is easily accessible by the public. The Del Clarke Dam is owned by the Lac qui Parle – Yellow Bank Watershed District and is also accessible to the public.
- Emergency plans for dam safety have been created by the US Army Corps of Engineers or the NRCS, but have a tendency to become out of date when not used; however the Yellow Medicine Emergency Plan has been recently updated. The US Army Corps Engineers does not regularly work with local emergency managers to ensure that information is up-to-date and in the event of a disaster, plans can be implemented.

TECHNOLOGICAL HAZARDS – PRESENTED BY MAN

Introduction

Source: Minnesota State Hazard Mitigation Plan

Technological hazards are a part of everyday life, a result the modern world in which we live. The challenge is to benefit from the use of technology while limiting potential harm to the community. In order to fully realize the benefits of technology, it is necessary to plan an effective response to unwanted technological emergencies before they occur.

From a hazard mitigation perspective, the existence of technological hazards in the community poses a risk to life, health, or property, just as natural hazards do. The use of hazardous materials in manufacturing and transportation can be extremely harmful if an unwanted release occurs and the use of nuclear materials in the presence of a community creates risks that must be managed. While dam failure can result from natural hazards, dams will still have a catastrophic impact on those downstream if poor engineering or construction cause it to fail. Further, the furnishings in our homes make a pleasant living environment, but are often flammable and produce toxic gases if ignited.

For the purposes of this plan, technological hazards identified are organized into these groups:

- 1. Infectious Diseases**
- 2. Fire**
- 3. Hazardous Material**
- 4. Water Supply Contamination**
- 5. Wastewater Treatment System Failure**
- 6. Civil Disturbance/Terrorism**

Infectious Diseases

An infectious disease is defined as an organism or virus that has the potential to spread or affect a population in adverse ways. Infectious diseases have the potential to affect any form of life at any time based on local conditions, living standards, basic hygiene, pasteurization, and water treatment. Despite breakthroughs in both medicine and technology, infectious diseases continue to pose a major public health risk. Today, the issue of emerging and re-emerging infectious diseases is at the forefront of public health concern. The very young, older adults, immunocompromised individuals, and hospitalized or institutionalized patients are at an increased risk for many infectious diseases. Changes in demographics, lifestyle, technology, land use practices, food production and distribution methods, child care practices, immunization, as well as increasing poverty, have roles in emerging infections.

Many infectious diseases are preventable and controllable. Prevention and control of infectious diseases involve collection of accurate condition assessment data. Outbreak detection and investigation and the development of appropriate control strategies (both short and long term) are based on specific epidemiological data. These activities require close collaboration among clinical providers (especially infection-control practitioners within hospitals), clinical laboratories, state and local health departments, and federal agencies. Furthermore, a need exists for

continued education of food industry professionals, health-care students and providers, as well as research to improve immunizations, diagnostic methods, and therapeutic modalities. The prevention of infectious diseases requires multidisciplinary interventions involving public health professionals, medical practitioners, researchers, community-based organizations, private and volunteer groups, industrial representatives, and educational systems.

History of Infectious Diseases in Yellow Medicine County

Yellow Medicine County has experienced individual cases of infectious diseases over the last 50 years that have been considered isolated occurrences or minor exposures.

In contrast to typical natural disasters in which critical components of the physical infrastructure may be threatened or destroyed, an infectious disease outbreak may also pose significant threats to the people responsible for critical community services due to wide spread absenteeism in the workforce. In the non-health sector, this might include highly specialized workers in the public safety, utility, transportation, or food service industries, and will likely vary from jurisdiction to jurisdiction. State and local officials should carefully consider which services and key personnel within relevant firms or organizations are essential. It is important to identify where absenteeism would pose a serious threat to public safety or would significantly interfere with the ongoing response to the outbreak. To offset this issue, Countryside Public Health has collaborated with Yellow Medicine County to create a Continuity of Operations Plan that determines priority activities that will help to ensure an office will be able to remain open during times of high absenteeism. In general, infectious diseases would have no effect on physical property but there would be a negative impact on the economy if a widespread outbreak were to occur. As a result of an infectious disease outbreak, businesses may be forced to shut down for an extended period.

Yellow Medicine County's entire population is susceptible to exposure from an infectious disease because of the random nature of diseases. Infection rates and exposure risk will vary based on the disease, individual sanitation habits and personal behaviors. Large population concentrations and sites with large numbers of people are especially at risk in the event of an outbreak. The following infectious diseases, divided by type, could be considered a health risk and disaster if a large outbreak occurred.

Human Health

Pandemic A pandemic occurs when a disease is prevalent throughout an entire country, continent, or world, greatly affecting the human population. Many pandemics have occurred throughout history including small pox, cholera, measles, tuberculosis, and more recently HIV/AIDS and influenza. In November 2005, the U.S. Department of Health and Human Services (HHS) released a comprehensive plan to address responding to a possible pandemic (Minnesota Department of Health 2009). Numerous state, local, and private entities have defined responsibilities to fulfill in the event of pandemic. For instance, the Department of Public Safety is responsible for organizing and coordinating a statewide response to a pandemic and the Minnesota Department of Health along with the Countryside Public Health and other local healthcare providers will work to minimize the impact of a pandemic on human health.

Vaccine Preventable Diseases

While most medicines treat diseases, vaccines prevent diseases by stimulating the immune system with the same germs that can cause the disease. Vaccines contain germs that have either been killed or weakened, which cause the immune system to produce antibodies as if a person was exposed to the disease. This process gives people immunity to a particular disease without actually having the disease. There are a number of vaccine preventable diseases that could affect residents of Yellow Medicine County. More information on vaccine preventable diseases can be found on the Center for Disease Control and Prevention (CDC) website: <http://www.cdc.gov/vaccines/vpd-vac/>.

It is important that all people in good health have completed recommended vaccination schedules to prevent disease outbreaks. Certain vaccinations are required for children to attend school (DTaP, polio, MMR, hepatitis B, Varicella, TD). Data collected for the 2013-14 school year show that over 90% of children who attend school are vaccinated against diphtheria, tetanus, pertussis, polio, measles, mumps, rubella, hepatitis B and varicella. Some individuals such as the very young, those in poor health, and the elderly should not receive certain vaccinations. When large percentages of the population are vaccinated, a 'Herd Immunity' can help to prevent the spread of these diseases to these individuals. Legal exemptions in Minnesota for kindergarten and seventh grade remain low. Less than 3% of students have a conscientious objection from all vaccines, and less than 0.05% have a medical exemption from all vaccines.

Seasonal Influenza According to the CDC, influenza (flu) is a contagious respiratory illness caused by influenza viruses that infect the nose, throat, and lungs. Flu viruses are believed to spread via droplets made when people with flu cough or sneeze. Possible symptoms of the seasonal flu include fever, cough, sore throat, runny or stuffy nose, muscle or body aches, headaches, fatigue, and possible vomiting and diarrhea. The best way to prevent seasonal influenza is to get vaccinated. Each year, a new vaccination is created that works to protect against new strains of Influenza Type A and Influenza Type B. One of the most severe strains in recent years was H1N1, also known as Swine Flu, which was first detected in 2009. More information can be at <http://www.cdc.gov/flu/>.

Hepatitis A Hepatitis A is an enterically transmitted viral disease that causes fever, malaise, anorexia, nausea, and abdominal discomfort, followed within a few days by jaundice. The disease ranges in clinical severity from no symptoms to a mild illness lasting between one and two weeks to a severely disabling disease lasting several months. In developing countries, hepatitis A virus is usually acquired during childhood, most frequently as a symptomatic or mild infection. Transmission can occur by direct person-to-person contact; exposure to contaminated water, ice or shellfish harvested from sewage-contaminated water; or from fruits, vegetables, or foods eaten uncooked, which can become contaminated during harvesting or subsequent handling. Hepatitis A has not occurred in Yellow Medicine County since 1995 (Minnesota Department of Health 2009). It has however, become more prevalent again as people eat outside of the home more frequently.

Other vaccine preventable diseases include but are not limited to small pox, measles, mumps, rubella, pertussis (whooping Cough). More detailed information can be found at www.cdc.gov/vaccines/vpd-vac/.

Vector Borne Diseases

Vector borne diseases are bacterial and viral diseases transmitted by mosquitoes and ticks. According to the Center for Disease Control and Prevention (CDC), vector borne diseases include some of the world's most destructive diseases. They have become an increasing threat to human health as globalization increases and changes in the environment and climate change become more prevalent. Many vector borne diseases can infect animals as well as humans. Common vector borne diseases in Minnesota include West Nile Virus, La Crosse Encephalitis, and Lyme Disease. Although rare in Minnesota, isolated cases of Rocky Mountain Spotted Fever have been reported from various parts of the state. Chikungunya is a mosquito transmitted disease that has been found in parts of Africa, Southern Europe, Southeast Asia, and islands in the Indian and Pacific Oceans. In 2013, chikungunya was found for the first time in the Americas. Since then it has spread to the Caribbean, South and Central America and in North America. In 2014, there were 11 locally transmitted cases reported in Florida. In Minnesota, 24 travel-associated cases were reported. More information on vector borne diseases can be found at <http://www.cdc.gov/ncezid/dvbd/>.

West Nile Virus (WNV) The virus made its first appearance in Minnesota in July 2002. In the fall of 2003, the first West Nile death in Minnesota was reported. Since 1999 Minnesota has reported 635 human cases of West Nile Virus and seven deaths. Yellow Medicine County has experienced 9 cases since 2010 (Countryside Public Health).

Most people with West Nile virus will experience only mild symptoms – or no symptoms at all. Twenty percent of those bitten by an infected mosquito will develop the symptoms of West Nile fever. One out of every 150 people who become infected will become severely ill and will develop West Nile encephalitis, an inflammation of the brain. Approximately 10 percent of these encephalitis cases are fatal. Symptoms of the illness usually show up two to six days after being bitten, although the incubation period can be as long as 15 days. Symptoms of West Nile fever can include headache, high fever, nausea, vomiting, sore throat, backache, joint pain, prominent muscle aches and weakness, prolonged fatigue, rash and swollen lymph nodes. West Nile encephalitis symptoms can include mental status changes, vomiting, sensitivity to light, altered reflexes, seizures, coma and acute flaccid paralysis. People who suspect that they may have West Nile are recommended to see a physician.

Respiratory Illnesses

Respiratory illnesses such as Pertussis (whooping Cough), SARS (Severe Acute Respiratory Syndrome), MERS (Middle East Respiratory Syndrome), Enterovirus 68, and other flu viruses are common in the United States and around the world. Many of these illnesses could be prevented with vaccination. However, viruses and bacteria are constantly changing and mutating making vaccines and antibiotics outdated quickly. This is the reason new flu vaccines come out each year. More information on respiratory illnesses can be found at <http://www.cdc.gov/ncird/>.

Gastrointestinal Illnesses

Many gastrointestinal illnesses in humans are a result of germs passed on by animals or other humans through water, food, and direct contact. Common illnesses include Salmonella, E.Coli, Norovirus (Norwalk Virus), and Cryptosporidium (Crypto). Hand washing is the first step to prevent the transfer of these illnesses. More information can be found at <http://www.cdc.gov/zoonotic/qi/>.

Ebola Virus The 2014 Ebola epidemic is the largest in history, killing over 10,000 people in West Africa. Since it was discovered in 1976, there have been sporadic outbreaks in humans in Africa. Although the Ebola virus was reported in the United States on a few occasions in 2014, no cases have been reported in Minnesota. Symptoms of Ebola include fever, headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal pain, and unexplained hemorrhaging. Further information on the Ebola virus can be found at <http://www.cdc.gov/vhf/ebola/>.

Animal Health

Wildlife diseases are a major area of concern in colonial water birds or major concentrations of waterfowl. Diseases, such as Newcastle disease or Avian Influenza, exist in the wild and outbreaks will occur. However, the extent to which animals die or disease is spread can be minimized through early identification.

Animal diseases of concern, particularly in cattle and flocks in Yellow Medicine County and nearby areas include Mad Cow Disease (Bovine Spongiform Encephalopathy), Foot-and Mouth disease, Chronic Wasting Disease, Rabies, and Brucellosis. Most recently, in early 2015, H5N2 Avian Influenza was found in commercial turkey flocks in seven counties near Yellow Medicine, including Lac qui Parle County, immediately to the north. Precautions are being taken to prevent the spread of this virus and efforts are being made to identify the source. The United States Department of Agriculture is the lead investigator in this outbreak. The Minnesota Department of Health is monitoring workers for illness. More information on these and other animal health issues can be found at <http://www.aphis.usda.gov/wps/portal/aphis/home/>.

Relationship to Other Hazards – Cascading Effects

Associated with Other Disasters Infectious disease outbreaks can occur as primary events themselves, or they may be secondary events that occur during another disaster or emergency such as a terrorist attack, biological accident, or natural hazard event.

Riots/Civil Disturbance. If an epidemic event were to occur, deaths, fear and misinformation could trigger large-scale riots, panic and lawlessness. Infectious diseases have the potential to be local, regional, statewide or national in scope and magnitude.

Plans and Programs for Infectious Diseases

Emergency Operations Plan Yellow Medicine County currently has an emergency operations plan known as the Yellow Medicine County Emergency Operations Plan. This plan outlines procedures for county and local governments for contacting appropriate state and federal

agencies, guidelines and strategies for dealing with infectious diseases, and command structures with the County Health Department and the Emergency Manager for Yellow Medicine County. Public education lies with public health as well. Much of the information is coordinated with the Center for Disease Control and Prevention and the Minnesota Department of Health.

Emergency Response Plan Response plans are incorporated into the Emergency Operations Plan and are added as needed. Countryside Public Health maintains emergency response plans and the state provides a framework as new plans are necessary. (As an example, the Foot and Mouth Disease Emergency Response Plan was written March 2002 and adopted into Yellow Medicine County's Emergency Operations Plan.)

Cooperation with State Health Department Countryside Public Health works with the Minnesota Department of Health to address infectious diseases that are listed in Chapter 4605.7040 Disease and Reports (such as Encephalitis, Hepatitis, Influenza, Lyme Disease, Tuberculosis and Syphilis). If any of these or other listed diseases should appear in Yellow Medicine County, the county works in cooperation with both the state health department and the Centers for Disease Control and Prevention.

Notification Communication between Countryside Public Health, the Minnesota Department of Health and the Center for Disease Control operates 24 hours, seven days a week depending on where an outbreak first occurs. Countryside Public Health, Yellow Medicine County Answering Point and the County Emergency Manager receive health alerts via email and fax with instruction with how to proceed. Hospitals, clinics, city administrators, emergency managers and county commissioners are notified by both Countryside Public Health and the Minnesota Department of Health.

Health Alert Network The Health Alert Network has been developed as part of Center for Disease Control's (CDC) Public Health Emergency Preparedness & Response Program. This network is tested twice yearly. The Health Alert Network coordinates and maintains the CDC's Public Health Emergency Preparedness & Response Website (<http://www.bt.cdc.gov/>). The Health Alert Network (HAN) is a nationwide, integrated information and communications system serving as a platform for distribution of health alerts, dissemination of prevention guidelines and other information such as distance learning, national disease surveillance and electronic laboratory reporting, as well as for CDC's bioterrorism and related initiatives to strengthen preparedness at the local and state levels. The Health Alert Network ensures:

- High-speed, secure Internet connections for local health officials, providing access to CDC's prevention recommendations, practice guidelines, and disease data.
- Capacity for rapid and secure communications with first responder agencies and other health officials.
- Capacity to securely transmit surveillance, laboratory, and other sensitive data.
- On-line, Internet- and satellite-based distance learning systems.
- Early warning broadcast alert systems.
- Public health agencies achieve high levels of organizational capacity.

Vaccination Program Minnesota Vaccine for Children (MVFC) is a program that offers affordable vaccines for all children at local clinics and is designed to assist families of need in protecting their children from infectious diseases. Children (0-18 years) who fall within any of the following categories are eligible for this program:

- Uninsured
- American Indian/Alaskan Native
- Covered by a Minnesota Health Care Program (MHCP) including:
 - Fee-for-service Medical Assistance (MA)
 - MinnesotaCare (MnCare)
 - Prepaid Medical Assistance Plan (PMAP)
 - Underinsured (patients with private insurance that does not cover the vaccine itself or has a cap).

Quarantine/Isolation Plan The state is ultimately responsible to handle quarantine/isolation issues. Countryside Public Health has developed a quarantine/isolation plan that would provide follow-up to those in isolation/quarantine and ensure their basic needs are met.

Program Gaps or Deficiencies for Infectious Diseases

- Countryside Public Health has a plan in place with multiple ways to reach the public. This plan requires and receives continuous review, constant monitoring, and updates as necessary.

Fire

Urban fires are blazes that spread through structures, posing danger and destruction to property. These fires include any instance of uncontrolled burning which results in structural damage to residential, commercial, industrial, institutional or other properties in developed areas. Fires can occur in any community, and pose threats year round.

History of Fires in Yellow Medicine County

According to the State Fire Marshal Division, through the fire reporting system updated in 2007, Yellow Medicine County had reported that they lost 11 civilian lives in a 30-year period to fires. Fires have occurred throughout the entire county (see Table 3.7). However, fires are more probable in the cities due to the density and number of both residential and commercial structures. Cooking, electrical failure and chimneys cause many of the residential fires in Yellow Medicine County.

Table 3.7 YMC and Community Breakdowns of Fire-related Information in 2012

Community	Total Fire Runs	Total Other Runs	Total Dollar Loss
Yellow Medicine County	78	44	\$1,230,850
Canby	20	3	\$344,500
Clarkfield	6	6	\$102,000
Echo	2	0	\$0
Granite Falls	28	1*	\$115,650
Hanley Falls	5	3	\$301,700
Hazel Run	*	*	*
Porter	6	11	\$30,000
St. Leo	4	2	\$0
Wood Lake	7	0	\$337,000

* No data submitted.

Source: MN Department of Public Safety's "Fire in Minnesota: Annual Report 2012"

In 2012, one major fire in the county took place at the Liquor Store and Café in Echo. The fire began in the liquor store and proceeded to cause damage to the café as well.

Relationship with Other Hazards – Cascading Effects

Service Disruptions Major fires can completely destroy structures, including essential public facilities. Utilities such as electric and gas lines can be damaged and even destroyed.

Health Risks Destruction or damage to essential infrastructure such as water and wastewater facilities can cause public health risk. Firefighting is a job at which multiple dangerous situations are encountered and personnel may be put at high risk.

Hazardous Materials Many hazardous materials can be highly flammable, causing fires to spread rapidly and increasing danger to human lives in the event of explosion.

Plans and Programs for Fires

Fire Districts and Departments Structure fires are served by local fire districts and fire departments. Each district is responsible for fires within their jurisdiction, but they often work together on larger fires. All fire departments in the county are on the city level, and are also a part of the West Central Firefighters Association (which includes fire departments in the surrounding counties).

West Central Firefighters Association Fire departments that are members of the West Central Firefighters Association agree to make their fire-fighting equipment and personnel available to each other in the case of emergencies. Each department has the legal authority to send its fire-fighting equipment and personnel into other communities.

Zoning The Yellow Medicine County Zoning Department controls development of new construction, including the enforcement of safety restrictions like setbacks, coverage, depth, and structure height requirements. The County Planning and Zoning Coordinator is responsible for all new construction.

State Training County firefighters participate in mandatory firefighting training classes offered by the state.

Evacuation Plans Evacuation plans exist in all of the cities.

Program Gaps or Deficiencies for Fires

- Currently, the only evacuation plan can be found in the county emergency operations plan. Cities in the county do not have plans readily available for local residents.
- At this time, some alleys are not adequate to handle fire trucks. The alleys should be identified and widened in the future to provide adequate protection to every property in the county.

Hazardous Materials

Hazardous materials are chemical substances, which if released or misused can threaten the environment and/or health of a community. These chemicals are used in industry, agriculture, medicine, research, and consumer goods throughout Yellow Medicine County. Hazardous materials are found in the county in the forms of explosives, flammable and combustible substances, corrosives, poisons, and radioactive materials.

A hazardous material spill or release poses risks to life, health, and property. An incident can force the evacuation of a few people, a section of a facility, or an entire neighborhood or community, resulting in significant economic impact and possible property damage. Spilled material is costly to clean up and may render the area of the spill unusable for an extended period of time. Hazardous materials incidences are generally associated with transportation accidents or accidents at fixed facilities.

History of Hazardous Materials in Yellow Medicine County

Hazardous materials exist as part of everyday life in Yellow Medicine County. These materials make life easier and more comfortable for residents throughout the county. The challenge is to use, store, and transport hazardous materials in a safe way that does not harm communities and prepare an effective response to unwanted releases of hazardous materials when they occur. A hazardous materials accident can occur anywhere at any time.

Meth labs or other drug labs are most often located in rural or semi-rural areas. Yellow Medicine County is a rural area and could be a potential area for drug lab hazards, although to date there have not been any Meth Labs discovered in Yellow Medicine County.

The major concern for hazardous materials events for fixed facilities is primarily in the cities of Wood Lake, Clarkfield, Canby, Hanley Falls and Granite Falls. These towns have high concentration of hazardous materials at the chemical plants. The transport of hazardous materials in Yellow Medicine County is highly unpredictable. People and property on or immediately adjacent to transportation corridors throughout the county are at higher risk than those located one mile or more from a major county corridor. Yellow Medicine County assumes that the highest risk of an incident would be to areas in proximity to both rail lines and major roads and from large quantities of hazardous materials moving into and out of Yellow Medicine County. The airport facility also provides further concern based on the possibility of an aircraft or site incident involving some sort of hazardous material.

The specific hazards created by a release are dependent on the hazardous characteristics of the material, the amount released, the location of the release, and the weather and topographic conditions in the area. Identifying specific materials and those involved in transportation can provide a more specific assessment of the vulnerability.

According to the Minnesota Pollution Control Agency (see Table 3.8), 35 spills have occurred in Yellow Medicine County from July 2002 to December 2013. Five of the 26 hazardous material events had spills totaling over 1,000 gallons of material. Of the 35 spills, 16 took place in Granite Falls. Two communities, Hazel Run and Porter, had no reported spills during this time frame, and St. Leo had a single event in 2008 that resulted in the spill of 30 gallons of light fuel

oil and diesel. For a complete list of all hazardous spill events and amount of product released, see Appendix 10.

Table 3.8 YMC Hazardous Spills from 2002-2013

City	Number of Spills	Product Type
Canby	4	Light fuel oil & diesel, Asphalt, Sewage/Wastewater, Mineral Oil
Clarkfield	5	Pesticide, Fertilizer, Manure, Diesel, Herbicide
Echo	6	Light fuel oil & diesel, Hydraulic Fluid
Granite Falls	12	Food, Mineral Oil, Light fuel oil & Diesel, Paint, Sewage/Wastewater, Fertilizer, Acid/Base Chemicals, Unknown
Hanley Falls	1	Barrage & Fuel
Hazel Run	0	N/A
Porter	0	N/A
St. Leo	1	Light fuel oil & diesel
Wood Lake	2	Mineral Oil, Manure
Total	35	

Source: Minnesota Pollution Control Agency, 2014

Relationship to Other Hazards – Cascading Effects

Water Supply Contamination If a spill occurred, potable ground water is at high risk of being polluted.

Wastewater Treatment System Failure System failure would have direct impact on the health of humans and animals.

Transportation

Road, rail, aircraft, and pipeline all move hazardous materials presenting differing levels of risk. Transported products include hazardous materials passing from producers to users, between storage and use facilities as well as hazardous waste from generators going to treatment and disposal facilities.

The road system in Yellow Medicine County provides a network to transport both hazardous and non-hazardous material throughout the region and between local communities. Risks of a hazardous material event vary based on the classification of the road and its proximity to people and property. The risk of a major event is most severe in more populated western portions of the county and along state highways. According to the most recent findings at the Minnesota Department of Transportation (MnDOT), more than half of all accidents involving hazardous materials have occurred on the state roadways. Roads are a major concern in Yellow Medicine County due to the lack of information available regarding what is traveling on the road system on a daily basis.

According to MnDOT statistics, approximately 11 percent of all statewide transportation incidents involving hazardous material in 2002 were from rail transport. Valve leakage and safety valve releases are sources of material spills on pressurized and general service tank cars or other hazardous materials containers such as covered hoppers, inter-modal trailers/containers or portable tanks. Leaks manifest themselves as odors or vaporous clouds from tanker top valves; spraying or splashing from tanker top valves; wetness on the side of the car; or drainage from the bottom outlet valve. Depending on the type of rail car involved, a leak or spill could result in hundreds to thousands of gallons/pounds of a substance being released.

Hazardous materials on both the roads and rail lines pose a risk to Yellow Medicine County residents. Recently, there has been an increase in rail traffic through Western Minnesota as a result of oil being shipped east from North Dakota. While a spill could greatly affect residents anywhere in the county, a hazardous material spill would have the most impact on a city. Chapter 4 includes maps of each city in Yellow Medicine County with ½ mile buffers around rail lines and Minnesota State Highways. The United States Department of Transportation (US DOT) considers the area within ½ mile of rail lines the *Evacuation Zone* for Oil Train Derailments. Areas within one mile of rail lines are considered to be *Potential Impact Zones* in case of an oil train fire.

Yellow Medicine County has two small municipally-run airports that operate a general use facility for small businesses and pleasure uses only. Large amounts of flammable liquids, lubricants, and chemicals are stored at the facility. Accidents involving aircraft and chemicals related to their operation can create a potential situation where hazardous material could be released. In addition, the risk of an incident is further increased by any hazardous cargo that may be brought into the facility for transport.

Fixed Facilities

A variety of hazardous materials exist in fixed facilities throughout Yellow County, ranging from stored flammable liquids to radioactive materials and chemical agents. Some materials are particularly lethal even in small amounts, while others require strong concentrations with prolonged exposure periods to cause harm. Businesses housing hazardous materials are listed in the Emergency Operations Plan.

Facilities storing or using hazardous materials above minimum amounts have developed and filed a Risk Management Plan with the Local Emergency Planning Committee, State Emergency Response Commission and the Environmental Protection Agency. Each plan identifies significant hazards for the facility, likely release scenario for the hazards, estimated population impacted by the release, and specific steps to take in the event of a release to protect a population from harm.

Pipelines

Currently, over 78,000 miles of pipelines are located within the state of Minnesota. Two pipelines run throughout Yellow Medicine County carrying liquid gasoline and natural gas are owned by Magellan Pipeline Company LP and Northern Natural Gas Company. Table 3.9 identifies the type of commodity carried and length of pipelines by their respective owners.

Table 3.9 YMC Pipeline Report

Operator Name	Commodity Carried	Mileage
Magellan Pipeline Company LP	Gasoline Product	17.58 Miles
Northern Natural Gas Company	Natural Gas	64.84 Miles

Source: National Pipeline Mapping System, 2009

Methamphetamine and Clandestine Drug Labs

A clandestine drug lab (or “clan lab”) is a collection of materials and ingredients used to manufacture illegal drugs. Methamphetamine (meth) is the drug most commonly made in Minnesota labs. The Minnesota Department of Health (MDH) received information from 75 counties when they surveyed all 87 counties twice in 2005 from January to June and July to December to tract the number of meth lab discoveries. A total of 128 labs were found throughout all counties, 95 from January to June and 33 from July to December. In 2006, the total number of meth lab discoveries declined with only 73 discoveries in total (Minnesota Department of Health 2006, 2007). The majority of these labs were located away from the largest population centers, in rural or semi-rural areas. There have been no meth labs found in Yellow Medicine County.

Each drug lab is a potential hazardous waste site requiring evaluation and cleanup by hazardous waste professionals, West Central Chemical - Morris. Health effects occur in people exposed to lab chemicals before, during and after the drug-making process. While many of the ingredients used to make illicit drugs are common household products, both the production process and the mixtures produced can be extremely dangerous. In Minnesota, numerous law enforcement officers and staff from health, social service and other agencies have collapsed or become ill at clan lab sites. Jail and hospital staff members have become ill from exposure to meth lab chemicals on the clothing of people living or working at lab sites. MDH has received reports of people who have moved into former lab sites and have suffered chest and respiratory symptoms months after lab chemicals were removed.

The impact of illegal drug-making labs is also felt by neighbors and occupants when labs catch fire, explode, and cause the release of chemicals and chemical waste into the surrounding environment. Finally, clan labs have been associated with increased crime in the surrounding community, including domestic abuse, theft, and child endangerment.

Roughly 50 percent of Minnesota residences where drug labs have been discovered have also housed children. Recognizing the special risks to children living in lab environments, the Minnesota legislature has recently expanded child neglect and endangerment law to include

endangerment through exposure to illegal drug manufacture and sales. In 2005, the Minnesota Legislature passed a law intended to reduce the number of meth labs and increase penalties for illegal meth usage.

In many Minnesota communities, there are no laws requiring cleanup of a hazardous waste site (particularly one contaminated by non-standard use of common household products) in a private residence. The Minnesota Bureau of Criminal Apprehension is usually involved in the case and the cleanup to make sure it is thoroughly investigated and cleaned.

Plans and Programs for Hazardous Materials

State Agency Cooperation Yellow Medicine County works directly with the appropriate state agencies to address needs for responding to and mitigating the impacts of a hazardous event.

Emergency Operations Plan Yellow Medicine County currently has an emergency operations plan, known as the Yellow Medicine Emergency Operations Plan, which outlines procedures for dealing with hazardous material accidents, spills or releases.

Water Plan The Yellow Medicine County Local Comprehensive Water Plan recognizes that the county's ground water is impacted by both agricultural and residential fertilizer and pesticide applications. It further recognizes the number of hazardous waste generators by minor civil division from the Minnesota Pollution Control Agency.

Environmental Health Regulations Yellow Medicine County has worked to develop environmental health regulations and a County Safety Procedures and Policy Guide. These documents are cross-departmental plans that deal with hazardous materials, infectious diseases and food-borne illnesses. They serve to provide guidelines to protect the citizens of the county.

Training of Emergency Personnel The Emergency Medical Services and hospitals/ER staff train annually for decontamination due to hazardous materials. All emergency personnel are trained to at least the minimum Hazardous Materials Awareness level and all first responder groups conduct the required Occupational Health and Safety Administration training on a yearly basis.

Southwest Emergency Preparedness Team (SWEPT) SWEPT maintains a CHEMPACK cache in the southwest region for EMS and hospital staff to use for treatment of chemical spills or terrorism event.

Program Gaps or Deficiencies for Hazardous Materials

- The Yellow Medicine County Water Plan only addresses ground water contamination based on fertilizer or pesticide use from residential and agricultural uses. Additional detail for other hazardous substances impacting the county's ground water would provide more detailed findings regarding the overall quality and potential risks if a hazardous materials event happens.
- A county-wide warning system is in process of being implemented. As the warning system develops, the goal would be to have very few or no residents be left without warning in the event of a major catastrophe.

- Aside from Granite Falls, the county and other cities do not have plans, policies and/or procedures in place to deal with a drug lab incident in the county.
- Lack of information and awareness on the effects of drug labs has left the county susceptible to an accident that could impact a large area.
- Not all cities have ordinances in place to require the landlord to ultimately be responsible for cleanup in a drug lab incident. Each city, as well as the county, should have a written ordinance.
- Education by the public, business owners, and landlords could prevent and deter drug labs. Posters should be distributed to local vendors to watch for patterns of drug lab purchases.
- The county has not adopted the Environmental Health Regulations or the County Safety Procedures and Policy Guide.

Water Supply Contamination

Water supply contamination is the introduction of point and non-point source pollutants into public ground water and/or surface water supplies. Although minimal, water supply contamination does pose a threat in Yellow Medicine County.

Microbiological and chemical contaminants can enter water supplies. Chemicals can leach through soils from leaking underground storage tanks, feedlots, and waste disposal sites. Human wastes and pesticides can also be carried to lakes and streams during heavy rains or snow melt.

History of Water Supply Contamination in Yellow Medicine County

Drinking water in Yellow Medicine County comes from ground water and all cities have municipal water systems. All water plants are in good working condition and undergo annual inspections by municipal employees. Lincoln Pipestone Rural Water and individual wells provide drinking water for rural residences within Yellow Medicine County.

Relationships with Other Hazards – Cascading Effects

Infectious Diseases Polluted human water sources can produce illness and epidemics in both humans and animals.

Plans and Programs for Water Supply Contamination

Drinking Water Standards, Requirements The U.S. Environmental Protection Agency (EPA), as required by the Safe Drinking Water Act of 1974, sets uniform nationwide minimum standards for drinking water. State public health and environmental agencies have the primary responsibility for ensuring that each public water supplier meets these federal drinking water standards or more stringent ones established by the state.

Public Water Supply Monitoring The EPA requires an ongoing water quality-monitoring program to ensure public water systems are working properly. Local officials work together with the Minnesota Department of Health and the EPA to ensure that all public water supplies are safe. The EPA also requires all local suppliers to promptly inform the public if their supply becomes contaminated. Countryside Public Health Service performs inspections of drinking water in restaurants, bars and other private businesses at least annually.

Well Construction and Testing Since 1974, all water wells (public and private) constructed in Minnesota must meet the location and construction requirements of the Minnesota Well Code. Countryside Public Health has a certified lab to test for well contamination.

Lincoln Pipestone Rural Water Lincoln Pipestone Rural Water (LPRW) has separated their water supply into three parts to keep contamination contained and has an agreement with Marshall to supply half of their water supply, if deemed necessary. LPRW is interconnected to Canby and is working with the city of Dawson to obtain an additional supply of water.

Feedlot Pollution Prevention Several steps are being taken to protect ground water sources from feedlot runoff. County ordinances require all feedlots within the county to participate in the state's feedlot programs. County extension services promote best management practices to

minimize runoff from feedlots into rivers and feedlot locations are limited by county zoning ordinances. Expansion of existing feedlots is allowed with specific limitations.

Sealed Wells The Yellow Medicine County Comprehensive Water Plan sets aside cost share dollars to seal abandoned wells and over 600 homeowners have utilized the funds to seal unused wells in Yellow Medicine County.

Program Gaps and Deficiencies for Water Supply Contamination

- Some feedlots with fewer than 1,000 animal units are not in compliance with MPCA rules, and operators have not been informed of some standards.
- Some feedlots with fewer than 1,000 animal units have not been put into a GIS database.
- Well houses are often not locked.

Wastewater Treatment System Failure

Wastewater treatment and disposal is an important part of our need to protect and preserve Minnesota's water resources. Although minimal, failure of wastewater treatment systems poses a potential risk in Yellow Medicine County. Numerous hazards can impact water treatment plants, including severe flooding.

History of Wastewater Treatment System Failure in Yellow Medicine County

Wastewater systems typically pose higher risks of failure during the spring when melting snow and runoff can cause flooding. To date, no wastewater treatment systems have failed in Yellow Medicine County.

Relationships with Other Hazards – Cascading Effects

Infectious Diseases. The failure of septic treatment facilities and systems can have immediate adverse impacts on human health through communicable diseases and epidemics.

Water Supply Contamination. The failure of septic treatment facilities and systems can have immediate adverse impacts on potable water supplies.

Plans and Programs for Wastewater Treatment System Failure

Certified Operators and Inspections. The Minnesota Pollution Control Agency (MPCA) requires routine inspection of all public wastewater systems and these operators are required to take state training to maintain their certified operator status. All emergency plans for facilities are located at each office and a copy is maintained at the Yellow Medicine County Emergency Management office.

State Permit Enforcement. The Minnesota Pollution Control Agency (MPCA) regulates wastewater systems. State staff in the water-quality point-source program issue permits, monitors compliance through data review and inspections, and enforce permit conditions.

Program Gaps or Deficiencies for Wastewater Treatment System Failure

- The effects severe flooding would have on wastewater plants have not been determined. Granite Falls is in the process of working on this.
- Yellow Medicine County does not have an ordinance that requires periodic inspection of individual septic tank systems. However, Yellow Medicine County does maintain regulatory control over septic systems in the county through its construction permit process. The county requires that for each bedroom added to a residence, a septic system must be upgraded if it is found to be out of compliance. The County does inspect new construction permits, design, and installation.

Civil Disturbance/Terrorism

Human-caused hazards can be intentional, criminal, malicious uses of force and violence to perpetrate disasters against people or property. They can be the result of terrorism – actions intended to intimidate or coerce a government or the civilian population to further political or social objectives – which can be either domestic or international, depending on the origin, base and objectives of the terrorist organization

Hazards can result from the use of weapons of mass destruction, including biological, chemical, nuclear and radiological weapons; arson, incendiary, explosive and armed attacks; industrial sabotage and intentional hazardous materials releases; and cyber terrorism.

History of Terrorism/Civil Disturbances in Yellow Medicine County

Yellow Medicine County has no history of terrorist or individual acts designed to cause disasters against people or property. Vandalism, assaults and other criminal acts do occur, but these isolated incidents fall within the purview of local law enforcement.

School Violence. Violence in schools has become an increasingly important topic among teachers, students, and police. There is a focusing on preventing bullying, school shootings, vandalism, and overall safety. Regardless of the availability of drugs, alcohol, and weapons to youth, it appears as though school violence incidences are decreasing. This fact is demonstrated in the Minnesota Student Surveys completed in 2001 and 2007 in Yellow Medicine County. The majority of students “strongly agree or agree” to feeling safe walking to and from school and at school.

From 2001 to 2007, the data remained generally consistent in terms of the number of days students brought a gun onto school property. Ninety-eight percent of all students and 91% of males in 12th grade reported never bringing guns to school. Over 90% of all students reported never bringing non-gun weapons to school. However, 12th grade males reported bringing a non-gun weapon to school at a slightly higher rate.

Relationship to Other Hazards – Cascading Effects

Cascading effects of an intentional human-caused disaster are highly dependent on the specific mode used and asset targeted. Many of these have been detailed in the technological hazards portion of the plan covering dam failure and hazardous materials incidents. Fires and secondary explosions are possible with explosive attacks, and fires from arson attacks can extend beyond the intended target.

Plans and Programs for Terrorism/Civil Disturbances

Cooperation with State, Federal Officials. Yellow Medicine County officials are working with state and federal officials on domestic preparedness efforts, including the Department of Health to ensure that health care facilities are prepared for bio-terrorism events.

School Multi-Hazard Emergency Plans. Since 2003, every school district in Minnesota has been mandated by state statute to institute multi-hazard emergency planning that requires quarterly drills and other exercises. Each plan and practice is required to include prevention and response strategies – in particular to school violence. Each school implements their particular

plans differently, while holding to the same basic tenets and working with their respective law enforcement agency.

Emergency Plans. The hospital plan, EMS Plan, Countryside Public Health Plan, and Yellow Medicine County's Emergency Operations Plan identify the CHEMPACK cache that can be requested for treatment if chemical exposure is identified.

Program Gaps and Deficiencies for Civil Disturbance/Terrorism

- Design and operations of most facilities in the county were not developed with terrorism prevention in mind.
- Recreation facilities developed around the Del Clark Dam provide easy, unmonitored access to the structure.
- Yellow Medicine County government buildings, including the county courthouse and all city halls, have unrestricted pedestrian access.
- Most of the city halls within the county and the Yellow Medicine County courthouse do not have fire suppression systems and are not blast resistant. Newly constructed buildings have fire suppression systems.

PUBLIC ASSISTANCE AND INDIVIDUAL ASSISTANCE GRANT PROGRAM

Table 3.10 summarizes the Public Assistance Grant Program funds dispersed in Yellow Medicine County. Yellow Medicine County has not received any Individual Assistance Grant Program funds.

Table 3.10 Public Assistance Grant Program in YMC

Disaster Declaration	Disaster Type	Project Amount	Federal Share Obligated	Cost Share Percentage
1333	Severe Storms and Flooding	\$1,943,387.58	\$1,505,563.11	75%
1370	Severe Winter Storms, Flooding, and Tornadoes	\$1,055,582.32	\$822,805.33	75%
1622	Severe Winter Storm	\$31,442.88	\$24,770.70	75%
1830	Severe Storms, Winds, and Flooding	\$60,616.61	\$45,462.47	75%
1900	Flooding	\$279,433.46	\$209,575.12	75%
1941	Severe Storms and Flooding	\$331,293.48	\$239,429.66	75%
1982	Severe Storms and Flooding	\$313,079.89	\$234,809.98	75%

CHAPTER 4: RISK ASSESSMENT

OVERVIEW

The following risk assessment is divided into three parts. The first part consists of Hazard Prioritizations for each hazard which, are based on the information provided in Chapter Three. The second part discusses county vulnerability to natural hazards (Vulnerable Areas within Yellow Medicine County), and the third part consists of maps of each city's land use and critical facilities.

PRIORITIZED RISK ASSESSMENT

The following pages summarize important information about each hazard in the form of the subsequent risk assessment. This risk assessment was completed by the Yellow Medicine County All-Hazard Mitigation Task Force, who considered each of the following hazards in terms of four criteria. The four criteria included frequency of occurrence, warning time, potential severity, and risk level. The values for the prioritized risk assessment were determined by a variety of resources including meetings and discussions with the Local Task Force, Technical Task Force team, city representatives, and the County Emergency Manager to determine a ranking for each hazard based on the risk assessment criteria. The ranking method quantified each hazard's risk level by assigning number values to the criteria. From the numeric value assigned, an overall ranking for each hazard was determined, which allowed the hazards to be compared in order to assess which hazards pose the greatest risk in Yellow Medicine County. Information from the community profile, analysis of historic disasters, and information provided by the task force and public to identify past, present and future disasters were also taken into consideration.

Frequency of Occurrence: This criteria inquires how often it may happen and how likely is it that the hazard will occur. The number values are determined by:

- 1 Unlikely
- 2 Occasional
- 3 Likely
- 4 Highly Likely

Warning Time: This criteria inquires how much warning time is available prior to the event.

- 1 More than 12 Hours
- 2 6-12 Hours
- 3 3-6 Hours
- 4 None-Minimal

Potential Severity: This criteria inquires how severe the impact will be in a general sense.

- 1 Limited
- 2 Minor
- 3 Major
- 4 Substantial

Risk Level: The risk level looks at the amount of risk there will be overall as a result of the event.

- 1 Minimal
- 2 Limited
- 3 High
- 4 Very High

Table 4.1 Hazard: Violent Storms and Extreme Temperatures

Hazard:	Winter Weather Blizzard, Ice Storms, Heavy Snow, Extreme Cold	Summer Weather Thunderstorm, Lightning, Hail, Straight Line Winds, Extreme Heat	Tornado
Location	County	County	County
Historic events	3-6 storms per year 0-3 blizzards per year Often below freezing Extreme cold 1-3 days per year	1-3 storms per year 1-3 days of extreme heat per year	17 tornado occurrences in last 58 years. 1 every 3 years
Likely to happen now?	Yes	Yes	No
How often?	3-6 storms per year 1-3 blizzards per year Often below freezing Extreme cold 1-3 days per year	1-2 storms per year 1-3 days of extreme heat per year	.29 per year
Where would it strike?	County	County	County
How bad could hazard get?	2-3 days per storm, multiple storms in one season, limited visibility, record snow is 9-12 in. in one day and 70-79 in. in one season, record cold is -39°F wind chill is a factor	Lightning, strong wind and hail. Record heat is 111 °F. Humidity is factor	F4/F3
When would hazard likely occur?	November – March	Spring - Fall	Spring - Fall
What other hazards could occur simultaneously?	Wind, transportation accidents, extreme temp, collapsed structure/gas leaks, spring flooding, disruption of utilities	Flooding, lightning, hail, wind, transportation accidents, drought, violent storms, fires, wildfire, collapsed structure, gas leaks	Hazardous materials, utility failure, fire, collapsed structure, gas leaks
Economic impacts	Cost of snow removal, loss of livestock, school closing, store closing	Loss of livestock, fire potential, agriculture and property damage	Structure loss and community shut down
Loss of life impacts	Dangerous to transport emergencies, heat turn-off issues, transportation accidents	Lightning strike, heat stroke, rare	Extremely dangerous
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 3 Animals/Livestock: 2 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2	Citizens/People: 3 Animals/Livestock: 2 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2	Citizens/People: 3 Animals/Livestock: 3 Housing: 3 Critical Structures: 3 Infrastructure: 2 Total: 3
Risk Assessment			
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 4.0	<u>Frequency of Occurrence</u> 4.0	<u>Frequency of Occurrence</u> 2.55
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 1.09	<u>Warning Time</u> 2.45	<u>Warning Time</u> 3.18
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 2.55	<u>Potential Severity*</u> 2.64	<u>Potential Severity*</u> 4.0
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 1.73	<u>Risk Level**</u> 2.36	<u>Risk Level**</u> 2.95
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.34	<u>Overall Priority</u> 2.86	<u>Overall Priority</u> 3.17

Table 4.2 Hazard: Floods

Hazard:	100-year Floods	Other Flooding/Flash Floods
Location	Granite Falls, Cities, County	County, Hanley Falls
Historic events	1997, 2001	2002, 2014
Likely to happen now?	Yes	Yes
How often?	1% likelihood annually; 2 times per 10 years	2 times per 3 years
Where would it strike?	Along the Minnesota River, along ditches and rivers	Along rivers, drainage ditches, wetlands, basements, etc.
How bad could hazard get?	1997 was record year, improvements made since	Fast moving water, unable to prepare for floods
When would hazard likely occur?	Spring	Spring/Summer
What other hazards could occur simultaneously?	Utility failure, landslide, debris flow, interrupt transportation routes (emergencies), infectious diseases, hazardous material spills	Utility failure, landslide, debris flow, interrupt transportation routes (emergencies), infectious diseases, hazardous material spills
Economic impacts	Sandbagging and repair roads, agricultural loss	Repair roads, agricultural loss
Loss of life impacts	Danger if sandbagging	Danger if sandbagging
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 2 Animals/Livestock: 2 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2	Citizens/People: 3 Animals/Livestock: 2 Housing: 2 Critical Structures: 3 Infrastructure: 3 Total: 3
Risk Assessment		
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 2.09	<u>Frequency of Occurrence</u> 3.09
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 1.55	<u>Warning Time</u> 2.45
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 2.86	<u>Potential Severity*</u> 3.73
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 2.82	<u>Risk Level**</u> 3.45
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.33	<u>Overall Priority</u> 3.18

Table 4.3 Hazard: Drought

Hazard:	Drought
Location	County
Historic events	1976, 1988, 2003
Likely to happen now?	Occasionally
How often?	1 time per 20-30 years
Where would it strike?	County
How bad could hazard get?	1930's dust bowl
When would hazard likely occur?	Summer
What other hazards could occur simultaneously?	Utility failure (water, wastewater), Wildfires
Economic impacts	Crops/Agriculture
Loss of life impacts	Unlikely
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 2 Animals/Livestock: 3 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 2.73
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 1.0
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 3.91
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 2.73
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.59

Table 4.4 Hazard: Wildfire

Hazard:	Wildfire
Location	County – especially along the MN River Valley and CRP/CREP land
Historic events	2003 in Chippewa County (Milan area)
Likely to happen now?	Occasionally
How often?	Each year the potential increases as natural areas increase and managed burns do not take fuel away
Where would it strike?	County – especially along the MN River Valley and CRP/CREP land Yellow Medicine County has not experienced a wildfire prior to 2000
How bad could hazard get?	Potential for hundreds of acres to burn
When would hazard likely occur?	Summer
What other hazards could occur simultaneously?	Erosion/landslide, severe wind, scrap tire fires, structure fires, hazardous materials, utility failure
Economic impacts	Extremely expensive for local fire departments
Loss of life impacts	Extremely dangerous for firefighters 3 Fire-related deaths in past 10 years
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 2 Animals/Livestock: 3 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 1.27
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 3.36
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 2.0
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 1.64
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.07

Table 4.5 Hazard: Dam Failure

Hazard:	Dam Failure
Location	Along Minnesota River
Historic events	None
Likely to happen now?	No
How often?	Unlikely
Where would it strike?	Granite Falls Dam, Del Clarke Lake Dam
How bad could hazard get?	Dam could break and flood Granite Falls or Canby
When would hazard likely occur?	Spring/Summer/Fall – due to thaw or rain event
What other hazards could occur simultaneously?	Flooding
Economic impacts	Devastating to Granite Falls and Canby
Loss of life impacts	Could harm residents in Granite Falls and Canby
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 3 Animals/Livestock: 2 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 1.45
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 1.75
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 2.6
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 2.45
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.06

Table 4.6 Hazard: Infectious Diseases

Hazard:	All Infectious Disease
Location	County
Historic events	No major events West Nile death in neighboring county
Likely to happen now?	Unlikely with most Flu strains likely
How often?	From 2003-2008: West Nile – 5 cases (likelihood 1 case annually) E. Coli – 3 cases (likelihood .6 cases annually) Pertussis – 5 cases (likelihood 1 case annually) *all other diseases haven't occurred during the time span
Where would it strike?	Small population within county Hospitals/Schools – places with large vulnerable populations
How bad could hazard get?	Major outbreak of life-threatening disease
When would hazard likely occur?	Anytime for most diseases Summer for West Nile
What other hazards could occur simultaneously?	Riots, terrorist attack, natural hazard event
Economic impacts	Tourism industry All industries with workers not at jobs
Loss of life impacts	Major if life-threatening outbreak
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 3 Animals/Livestock: 3 Housing: 1 Critical Structures: 1 Infrastructure: 2 Total: 2
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 2.05
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 1.0
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 3.36
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 2.45
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.26

Table 4.7 Hazard: Fire

Hazard:	Fire
Location	Buildings/Cities/County
Historic events	3 fires per year
Likely to happen now?	Yes
How often?	Potential is always there. Average number of "Fire Runs" 59 per year
Where would it strike?	Structures throughout county
How bad could hazard get?	Entire structure/blocks could burn
When would hazard likely occur?	All year round
What other hazards could occur simultaneously?	Wildfire, hazardous materials, service disruptions, health risks
Economic impacts	Could harm business if fire is bad enough
Loss of life impacts	Potential if hazardous materials present Elderly and very young at risk 11 lives lost in past 30 years
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 3 Animals/Livestock: 3 Housing: 3 Critical Structures: 3 Infrastructure: 1 Total: 3
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 3.09
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 None-Minimal	<u>Warning Time</u> 3.82
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 2.82
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 2.64
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.93

Table 4.8 Hazard: Water Supply Contamination

Hazard:	Water Supply Contamination
Location	Granite Falls County - point and non-point sources Cities
Historic events	Granite Falls during flood events
Likely to happen now?	Likely – lift station in Granite Falls needs to be moved
How often?	Flood events – 2 times every 10 years
Where would it strike?	Granite Falls County - point and non-point sources
How bad could hazard get?	Water source could be contaminated for large population
When would hazard likely occur?	Year-round
What other hazards could occur simultaneously?	Infectious diseases
Economic impacts	Tourism, expensive to ship water in
Loss of life impacts	Potential to be life threatening
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 3 Animals/Livestock: 3 Housing: 2 Critical Structures: 3 Infrastructure: 2 Total: 3
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 2.36
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 3.64
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 3.42
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 3.25
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 3.17

Table 4.9 Hazard: Hazardous Materials

Hazard:	Hazardous Materials
Location	Major transportation routes (railroads, highways) Pipeline locations Canby, Clarkfield, Wood Lake, Hanley Falls, Granite Falls
Historic events	None
Likely to happen now?	Likely Potential increases as hazardous materials increase 35 hazardous material spills in 11 years, (3.18 likelihood annually)
How often?	35 hazardous material spills in 11 years, (3.18 annually)
Where would it strike?	Specific locations throughout county, along transportation routes in county and local businesses that have hazardous materials delivered, Meth Labs can occur anywhere.
How bad could hazard get?	Major spill could be devastating to human and animal life Meth Labs make people extremely sick.
When would hazard likely occur?	Year-round
What other hazards could occur simultaneously?	Wildfire, storm, water supply contamination, wastewater contamination
Economic impacts	Could shut down area of spill
Loss of life impacts	Some potential depending on material
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 3 Animals/Livestock: 3 Housing: 2 Critical Structures: 3 Infrastructure: 2 Total: 3
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 2.55
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 3.82
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 2.82
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 3.09
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 3.07

Table 4.10 Hazard: Wastewater Treatment Facility Failure

Hazard:	Wastewater Treatment System Failure
Location	County
Historic events	Individual systems and municipal systems have either gotten old or flooding has prevented from working
Likely to happen now?	Occasionally
How often?	Spring, during floods, or as systems age
Where would it strike?	County
How bad could hazard get?	Water source could be contaminated
When would hazard likely occur?	Year-round
What other hazards could occur simultaneously?	Infectious diseases, flood, water supply contamination
Economic impacts	During flood, losing wastewater system is expensive and inconvenient
Loss of life impacts	Could affect lives if contaminate water
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 3 Animals/Livestock: 2 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 1.27
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 3.08
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 2.09
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 1.91
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.09

Table 4.11 Hazard: Civil Disturbance/Terrorism

Hazard:	Civil Disturbance / Terrorism
Location	County, cities, dam, airports, water systems
Historic events	None
Likely to happen now?	Unlikely
How often?	School violence is increasing annually No actual "terrorism" events in County
Where would it strike?	County
How bad could hazard get?	Threaten way of life in county
When would hazard likely occur?	Year-round
What other hazards could occur simultaneously?	Infectious diseases, flood, dam failure, water supply contaminations, hazardous materials
Economic impacts	Potential to be devastating
Loss of life impacts	Potential to affect lives
Risk Level 1 Minimal 2 Limited 3 High 4 Very High	Citizens/People: 2 Animals/Livestock: 2 Housing: 2 Critical Structures: 2 Infrastructure: 2 Total: 2
Risk Assessment	
1 Unlikely 2 Occasional 3 Likely 4 Highly Likely	<u>Frequency of Occurrence</u> 1.36
1 More than 12 Hours 2 6-12 Hours 3 3-6 Hours 4 Non-Minimal	<u>Warning Time</u> 3.85
1 Limited 2 Minor 3 Major 4 Substantial	<u>Potential Severity*</u> 3.0
1 Minimal 2 Limited 3 High 4 Very High	<u>Risk Level**</u> 2.38
(Total divided by 4) 1 Very low 2 Low 3 Moderate 4 High	<u>Overall Priority</u> 2.65

The Overall Hazard Priority Levels were determined by calculating the average risk level for each hazard. The hazard was determined to be “Very Low” if the average risk number was between 1 and 1.49, “Low” if it was between 1.5 and 2.49, “Moderate” if between 2.5 and 3.49 and “High” if it was 3.5 or above. No hazards were determined to be of very low or high risk at the time of this document. The hazards were listed in numerical order for the Yellow Medicine Local Task Force to review and comment on at the third Local Task Force meeting in Clarkfield, MN on October 30, 2014. The team was presented with the Overall Hazard Priority Level determined by their risk assessments and the initial Overall Hazard Priority Level from the previous All-Hazard Mitigation Plan. Staff facilitators discussed differences between the two lists and opened up conversation on changes to be made. During this meeting, Flash Flood/Other Flooding was moved up on the list, while Structure Fire moved down on the list to their current locations, number 2 and 6 respectively. All other hazards kept their same locations on the list.

Table 4.12 Overall Hazard Priority Levels in Yellow Medicine County

Hazard	Yellow Medicine County	Special Areas of Concern
1. Summer Weather Thunderstorm, Lightening, Hail, Wind (excluding tornado) Extreme Heat	3.34 – Moderate	County
2. Flash/Other Flooding	2.65 – Moderate	County, Granite Falls, Hanley Falls
3. Winter Weather Blizzard, Ice Storms, Heavy Snow, Extreme Cold	2.80 – Moderate	County
4. Tornado	2.79 – Moderate	County
5. Water Supply Contamination	2.78 – Moderate	County
6. Structure Fire	2.93 – Moderate	County
7. Hazardous Materials	2.54 – Moderate	County
8. Civil Disturbance/ Terrorism	2.38 – Low	County
9. Wildfire	2.19 – Low	County
10. 100-year Floods	2.13 – Low	Granite Falls/Canby
11. Drought	2.08 – Low	County
12. Wastewater Treatment System Failure	2.03 – Low	County
13. Infectious Disease	2.0 – Low	County
14. Dam Failure	1.97 – Low	Canby/Granite Falls

VULNERABLE AREAS OF YELLOW MEDICINE COUNTY

The purpose of this section is to identify vulnerable areas in relation to Chapter 3, Hazard Inventory, which provides detailed information on the potential hazards that may impact Yellow Medicine County and/or cities within Yellow Medicine. This section identifies vulnerable areas and highlights specific events that have occurred throughout the county, as they pertain to four types of natural hazardous events: tornadoes, flooding, wildfires, and dam failure. The risk assessment maps for Yellow Medicine County identify areas that may be more prone to these hazardous events.

Tornados

According to the National Climatic Data Center, Yellow Medicine County has experienced 19 tornados and three funnel clouds since 1965. Of the nineteen tornados, nine were classified as F0, six were classified as F1, one was classified as F2, two classified as F3, and one classified as F4¹. Significant damage was seen in Clarkfield by an F3 tornado in 1992 and to Granite Falls by a F4 tornado in 2000. Figure 4.1 is a visual representation of past tornado paths in Yellow Medicine County. Many of the tornados occurred in rural areas of the county and did little damage to structures; however some of the more destructive tornados destroyed farm buildings and downed trees.

Traditionally, tornados are seen as a countywide hazard. In order to predict estimated damage caused by an F4/F5 tornado, Yellow Medicine County based fiscal analysis on the recommendation of the National Weather Service (NWS) Data Management Department. According to the NWS, an acceptable method to create a damage cost estimate model from a F4/F5 tornado in a small community could be performed by using cost data from a previous tornado event that occurred in Greensburg, Kansas with a population of approximately 1,500 people. The devastation totaled around \$250 million dollars and damaged approximately 95% of the city. To model an F4/F5 tornado, the NWS suggested approximating that 90% of each land use category be considered demolished. Using 2009 market values, Table 4.13 depicts this information, providing the number of parcels damaged and estimated damage value by city. Final damage amount is estimated at \$348,244,290 dollars impacting 3,811 parcels of residences, commercial/industrial buildings, schools, churches, and government-owned properties (summation of all city parcels and assessed parcel values).

¹ In 2007, the Fujita Scale (F-Scales) used to measure damage from tornadoes was updated in 2007 to the Enhanced Fujita Scale (EF-Scale). For more information on this update, please visit <http://www.spc.noaa.gov/faq/tornado/ef-scale.html>.

Table 4.13 YMC Estimated potential damage by an F4/F5 Tornado (2009 Market Value)

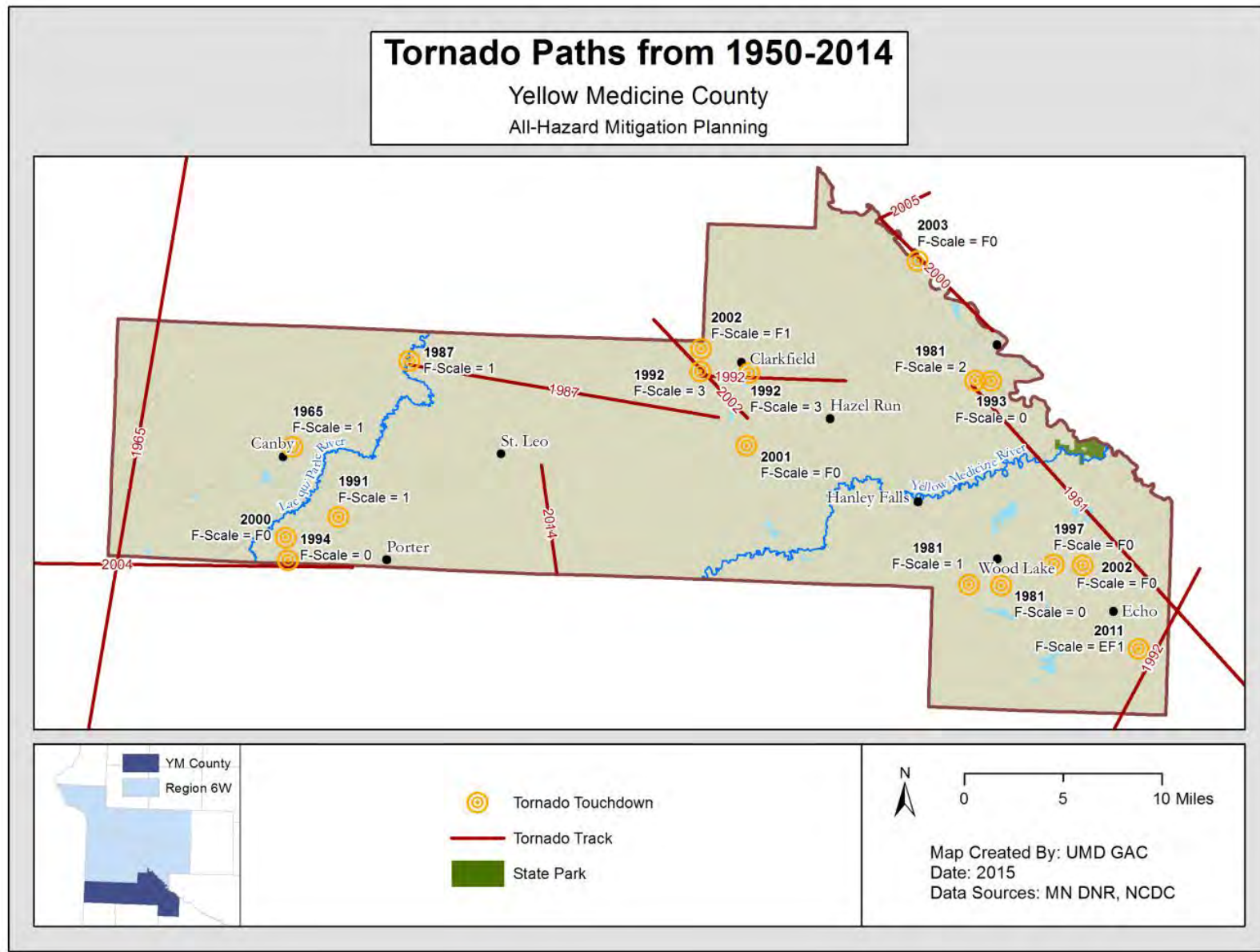
Geographic Area	Total Number of Parcels	Total Value of Parcels	90% of Total Parcels	Estimated Damage Value
Canby	1,127	\$89,222,400	1,014	\$80,300,160
Clarkfield	560	\$36,899,200	504	\$33,209,280
Echo	210	\$9,727,800	189	\$8,755,020
Granite Falls	1,781	\$212,997,400	1,603	\$191,697,660
Hanley Falls	190	\$7,896,600	171	\$7,106,940
Hazel Run	72	\$3,215,700	65	\$2,894,130
Porter	157	\$8,722,300	141	\$7,850,070
St. Leo	76	\$3,844,200	68	\$3,459,780
Wood Lake	282	\$14,412,500	254	\$12,971,250
Total (Yellow Medicine County)	4,455	\$386,938,100	4,010	\$348,244,290

Source: Yellow Medicine County Assessor, 2009

In addition to the information provided by Table 4.13, the two major tornadoes previously mentioned that impacted Granite Falls and Canby, provide case-study information that estimate total damage of two communities impacted by F3 and F4 tornadoes. On July 25, 2000 a tornado struck the city of Granite Falls. One person was killed, over a dozen injured, and an estimated \$20 million dollars of damage was done to residences, businesses, and public facilities. The tornado lifted before exiting Granite Falls, leaving a concentrated damage path two miles long, and 500 feet wide, through a primarily residential area of Granite Falls. Most of the damage in Granite Falls was caused by F2 to F3 wind speeds. However, this tornado was classified as a minimal F4 tornado, based on the twisted wreckage of an overturned railroad car near the intersection of 9th Avenue and 14th Street in Granite Falls.

On June 16, 1992, an F3 tornado hit the south part of Clarkfield turning one house completely upside down and ripping siding off many homes. On June 16th, spotters were instructed to watch for tornadoes. A touchdown was reported west of Clarkfield. This tornado damaged several buildings south and west of Clarkfield. The damage included several destroyed barns and buildings and a house was turned upside down and was set back on the foundation. A majority of the homes and businesses in the city were damaged and emergency workers estimated \$7 million worth of damage was inflicted on the community. During the remainder of 1992 and in 1993, \$2,350,000 worth of building permits were issued in the city of Clarkfield as residents worked to recover from the tornado damage. (Source: City of Clarkfield)

Figure 4.1 Tornado Paths from 1950 to 2014 in Yellow Medicine County



Floods

Two major flood events occurred in Yellow Medicine County in 1997 and 2001 causing major damage to the county and the City of Granite Falls in particular. In 1997, Yellow Medicine County spent \$2.2 million for flood fighting efforts and cleanup; compared to \$420,305 for flood fighting efforts and cleanup in 2001 (Yellow Medicine County Assessor, 2002). During the 1997 flood, the City of Granite Falls spent \$852,086 for flood fighting efforts and cleanup (cost figures provided by city staff). In 1997, over \$175,000 was spent by the US Corps of Engineers on construction contracts to fight the floods that resulted in an estimated \$3.1 million cost savings of potential flood damage costs. In 2001, the city spent an estimated \$437,115 for flood fighting efforts and cleanup. The US Corps of Engineers awarded temporary levee construction contracts in 2001 totaling \$112,250 for Granite Falls.

Between 1997 and 2001, flood fighting efforts cost hundreds of thousands of dollars and caused extensive property damages and economic hardship. The volunteers involved in the flood fighting efforts were in significant risk during these events. In 1997 and 2001 Granite Falls experienced floods, residential property damage and the forced evacuation of people from their homes. The total private property damages for the 2001 floods, based on estimates by the county assessor's office, were in excess of \$150,000. Damage to public structures amounted to \$1.5 million.

Table 4.14 Summary of Expenses to Fight Flooding

Geographic Area	1997 Flood	2001 Flood	Total
Yellow Medicine County	\$2,200,000	\$420,305	\$2,620,305
Granite Falls	\$852,086	\$437,115	\$1,289,201
Total	\$3,052,086	\$857,420	\$3,909,506

Source: Yellow Medicine County Assessor, 2002 & City of Granite Falls

The following section is a Flood Hazard Analysis for Yellow Medicine County that was completed by the University of Minnesota Duluth Geospatial Analysis Center. This analysis focuses on the potential impacts of a 100-year (1%) flood event, detailing the distribution of potential economic loss in Yellow Medicine County.

Flood Hazard Analysis for Yellow Medicine County

*For Upper Minnesota Valley Regional Development Commission
Level II Flood Hazard Analysis performed using FEMA Hazus-MH*

Contact Information:

Project Coordination:

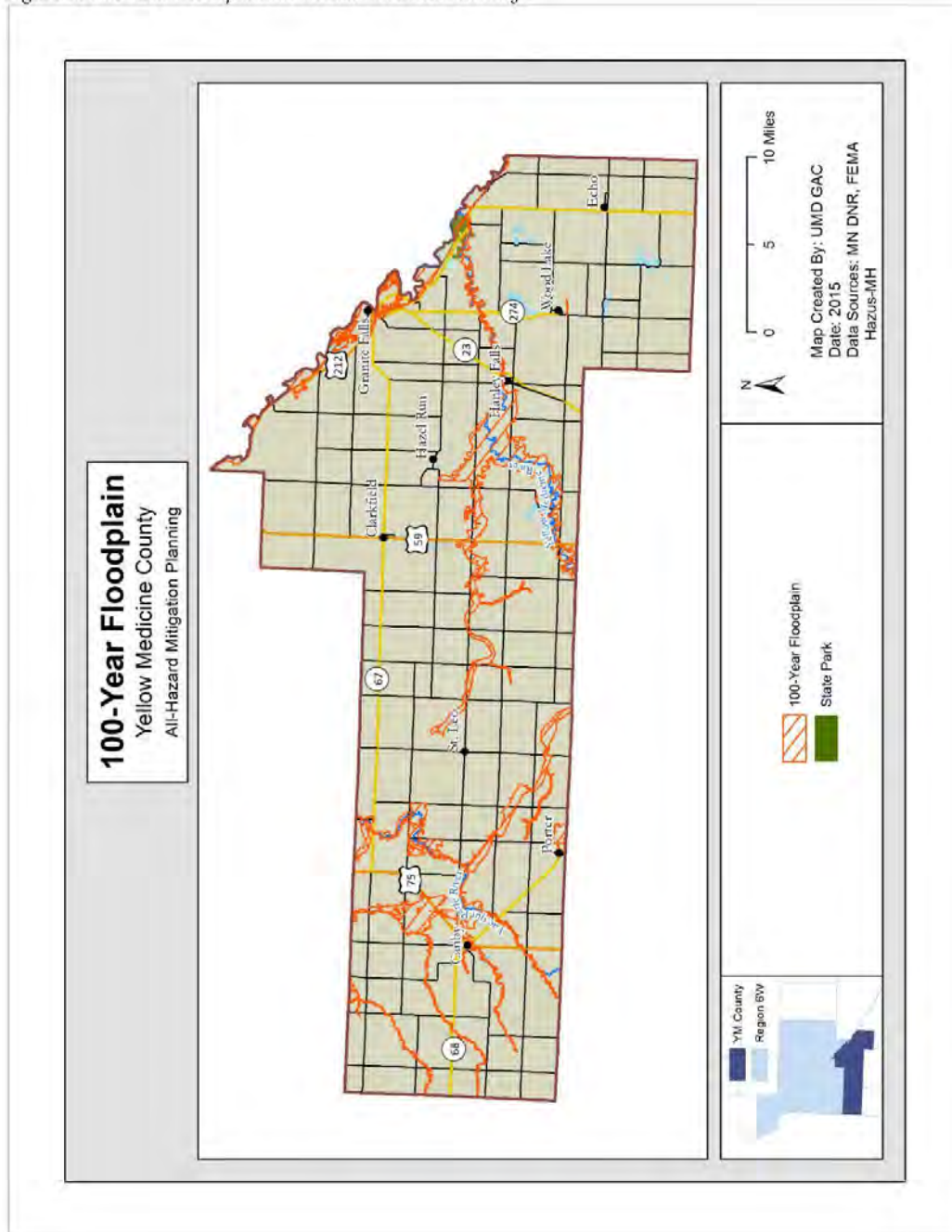
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Yellow Medicine County Hazus-MH Hazard Analysis

Hazus-MH 2.2 in ArcGIS 10.2.2 was used to estimate the damages incurred for a 100-year flood event in Yellow Medicine County using a Q3 (first generation FEMA digital data) and a 10-meter DEM (digital elevation model) to create a flood depth grid (no digital DFIRM was available). The resulting depth grid is shown in Figure 1.

Figure 1. 100-Year Floodplain in Yellow Medicine County



Yellow Medicine County specific building data was sourced from the parcel tax and spatial databases to include building valuations, occupancy class, square footage, year built, and number of stories. Yellow Medicine County had 4,784 parcels with building value and a populated occupancy class field. In cases where square footage, year built, or number of stories were missing, values were assigned based on best practices from values in the other 4 fields. The data were then assigned to one parcel centroid, which served as a surrogate for all of each parcel's buildings. Parcel centroid data were aggregated to the associated census block for use in the Hazus-MH model.

According to the Yellow Medicine County general building stock [updated with these parcel data], the Hazus-MH model estimates there are 4,784 buildings in the county with a total replacement value (excluding contents) of \$409 million (2010 dollars). Approximately 69% of the buildings (and 57% of the building value) are associated with residential housing. The model estimates 27 buildings will be at least moderately damaged. This is over 14% of the total number of buildings in the scenario. There are an estimated 17 buildings that would be completely destroyed.

The total economic loss estimated for the flood is \$27 million dollars, which represents 29% of the total replacement value of the scenario buildings. Building losses are broken into 2 categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood. The total building-related losses were \$26 million dollars. 2% of the estimated losses were related to the business interruption of the region. Residential occupancies made up 30% of the total loss.

The reported building counts should be interpreted as degrees of loss rather than an exact number of buildings exposed to flooding. These numbers were derived from the aggregate building inventories which are assumed to be dispersed evenly across census blocks. Hazus-MH requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

The total estimated number of damaged buildings, total building losses, and estimated total economic losses for the countywide 100-year flood are shown in Table 1. The distribution of economic losses for Yellow Medicine County is depicted in Figure 2.

Table 1. Yellow Medicine County Total Economic Loss from 100-Year Flood

General Occupancy	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure (In \$1000s)	Total Economic Loss (In \$1000s)	Building Loss (In \$1000s)
Agricultural	1330	3	\$136,977	\$15,798	\$3,624
Commercial	84	0	\$11,737	\$976	\$254
Education	6	0	\$12,753	\$0	\$0
Government	40	1	\$6,745	\$1,990	\$535
Industrial	1	0	\$10	\$0	\$0
Religious/Non-Profit	31	0	\$8,165	\$145	\$47
Residential	3,292	23	\$232,609	\$8,006	\$5,469
Total	4,784	27	\$408,996	\$26,915	\$9,929

Economic Loss in 100-Year Flood

Yellow Medicine County
All-Hazard Mitigation Planning

YM County
Region 6W

\$1,000 - \$30,000	\$236,000 - \$500,000
\$31,000 - \$100,000	\$501,000 - \$1,575,000
\$101,000 - \$235,000	

Map Created By: UMD GAC
Date: 2015
Data Sources: MN DNR, 2010 U.S.
Census, FEMA Hazus-MH

Census blocks of concern should be reviewed in more detail to determine the actual percentage of facilities that fall within the flood hazard areas.

Figure 3 shows the census block loss estimate clipped to the actual 100-year flood boundary for Canby, and Figure 4 shows this same information for Hanley Falls. Granite Falls is mapped in Figure 5.

Figure 3. 100-Year Flood Loss Estimates in Canby

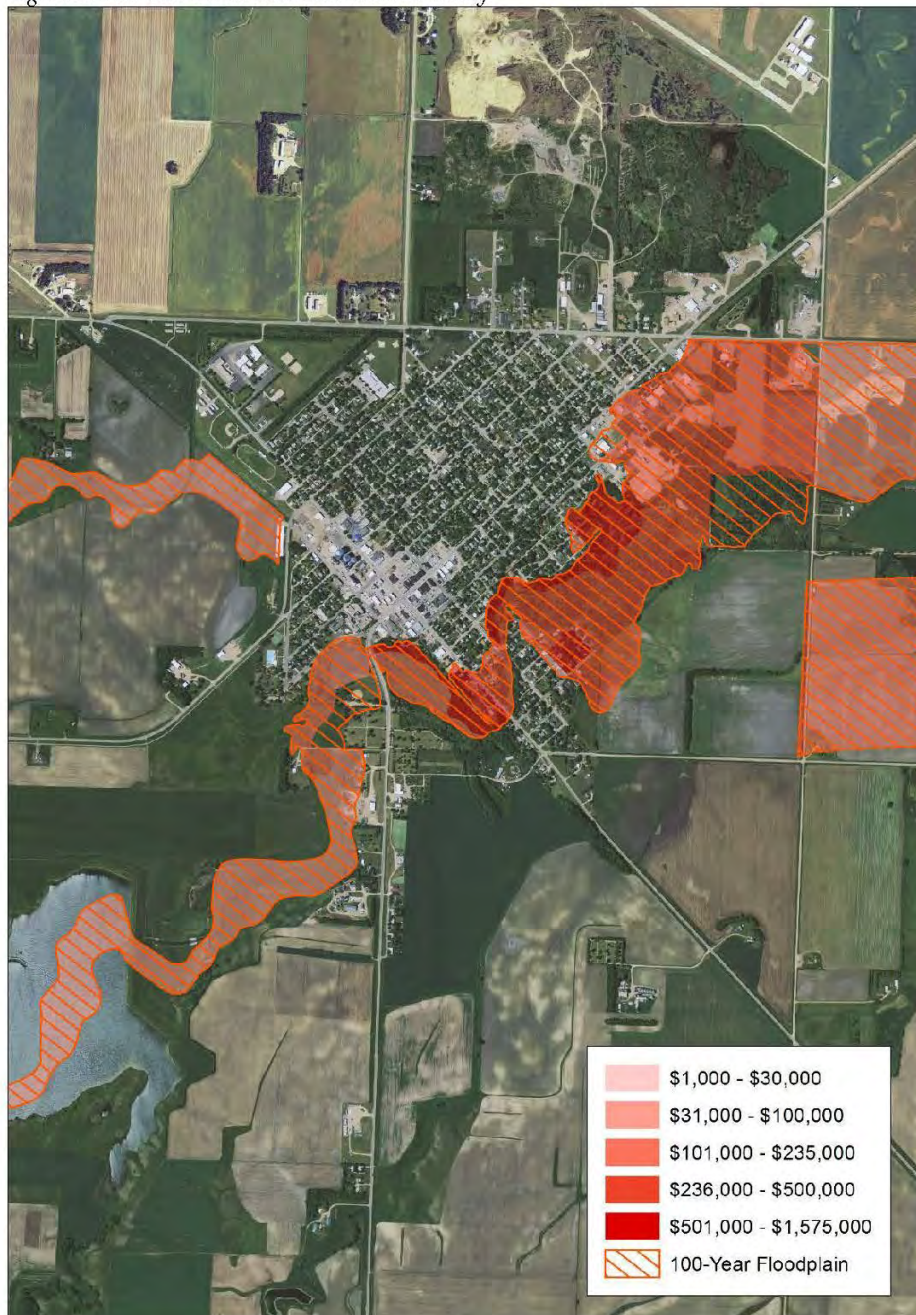


Figure 4. 100-Year Flood Loss Estimates in Hanley Falls

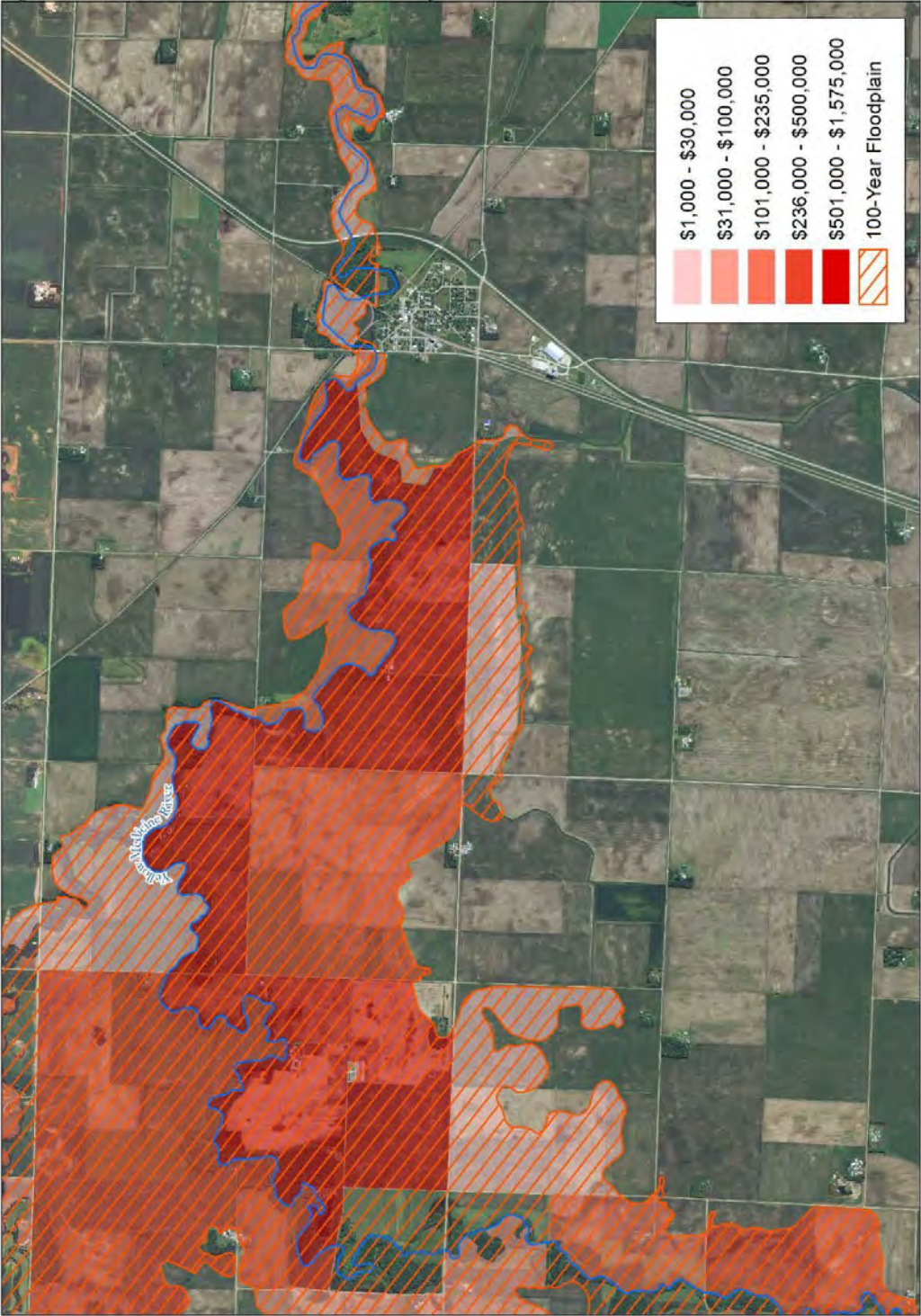
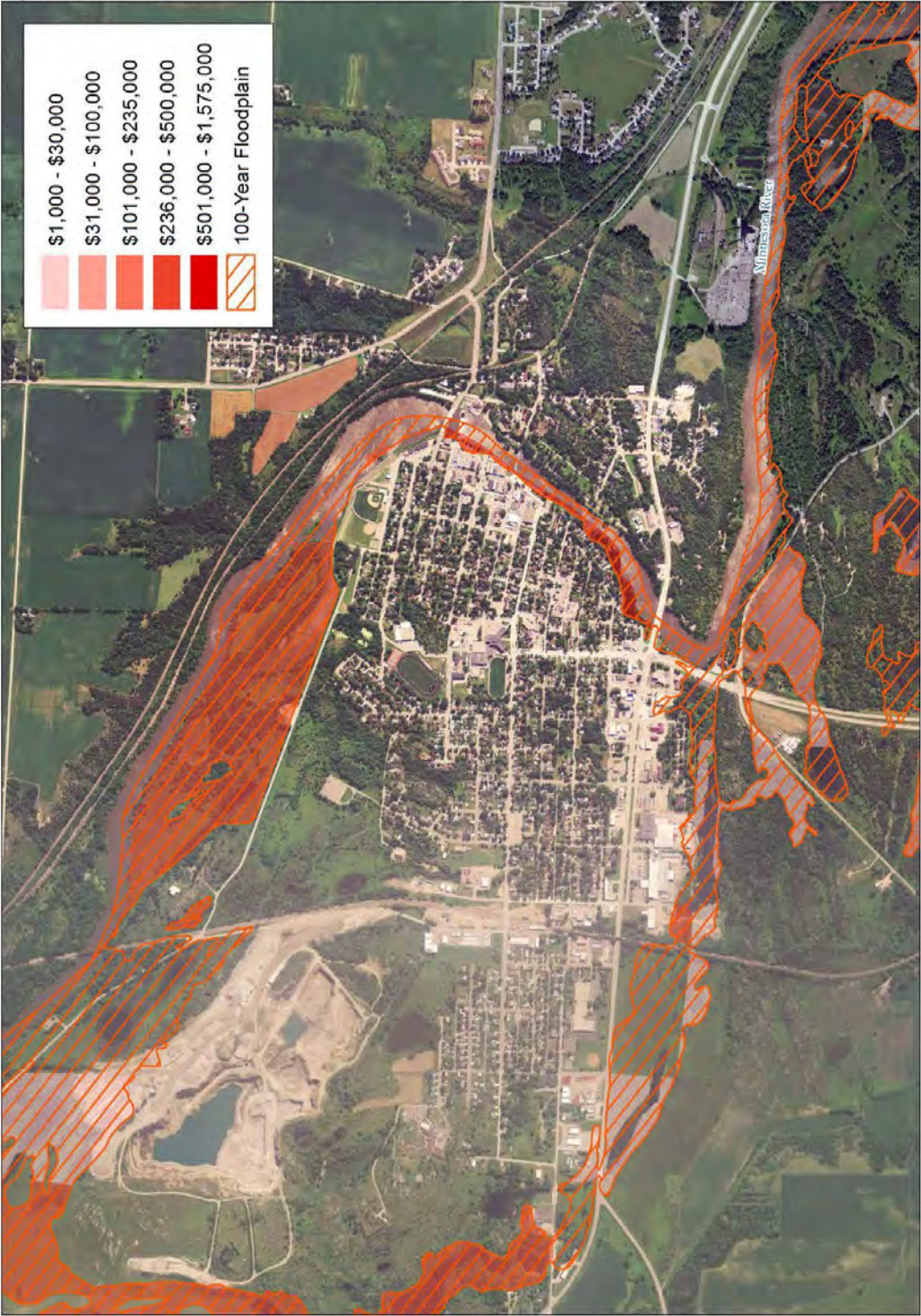


Figure 5. 100-Year Flood Loss Estimates in Granite Falls



The aggregate losses reported in this study may be overstated because values are distributed evenly in a census block. The 5 census blocks showing the highest estimated loss values are shown in Table 2, with their spatial extents shown in Figure 6, Figure 7, Figure 8, Figure 9 and Figure 10.

Table 2. Yellow Medicine County Census Blocks with the Greatest Estimated Losses in the 100-Year Floodplain

Census Block Number	Total Estimated Loss	Location
271739702002042	\$1,575,000	Canby
271739701004002	\$1,422,000	NW of Granite Falls
271739704001035	\$996,000	Hanley Falls
271739701002008	\$809,000	Granite Falls
271739702002022	\$790,000	Canby

Figure 6. Census Block #271739702002042 and 100-Year Floodplain, Canby



Figure 7. Census Block #271739701004002 and 100-Year Floodplain, NW of Granite Falls



Figure 8. Census Block #271739704001035 and 100-Year Floodplain, Hanley Falls

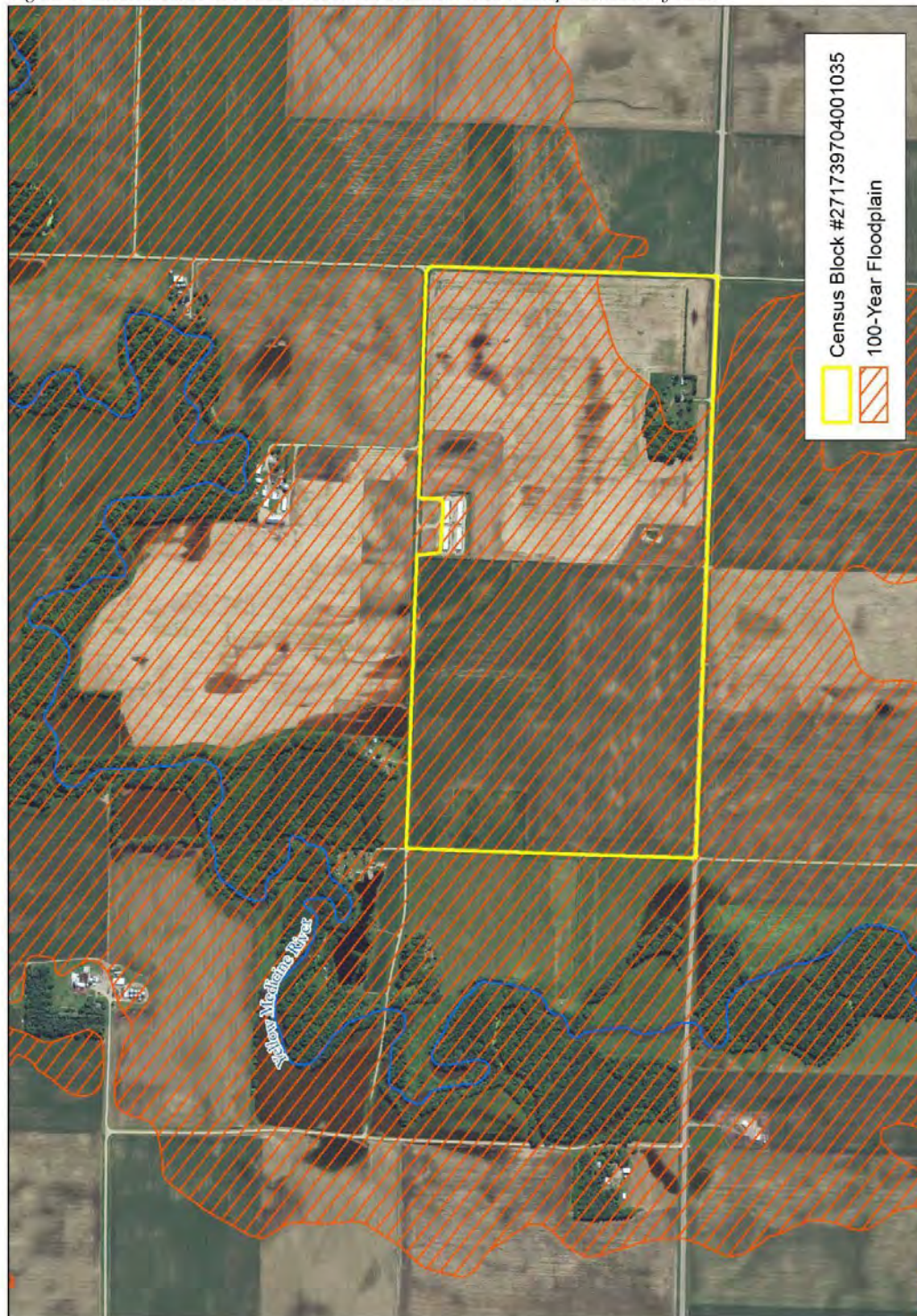
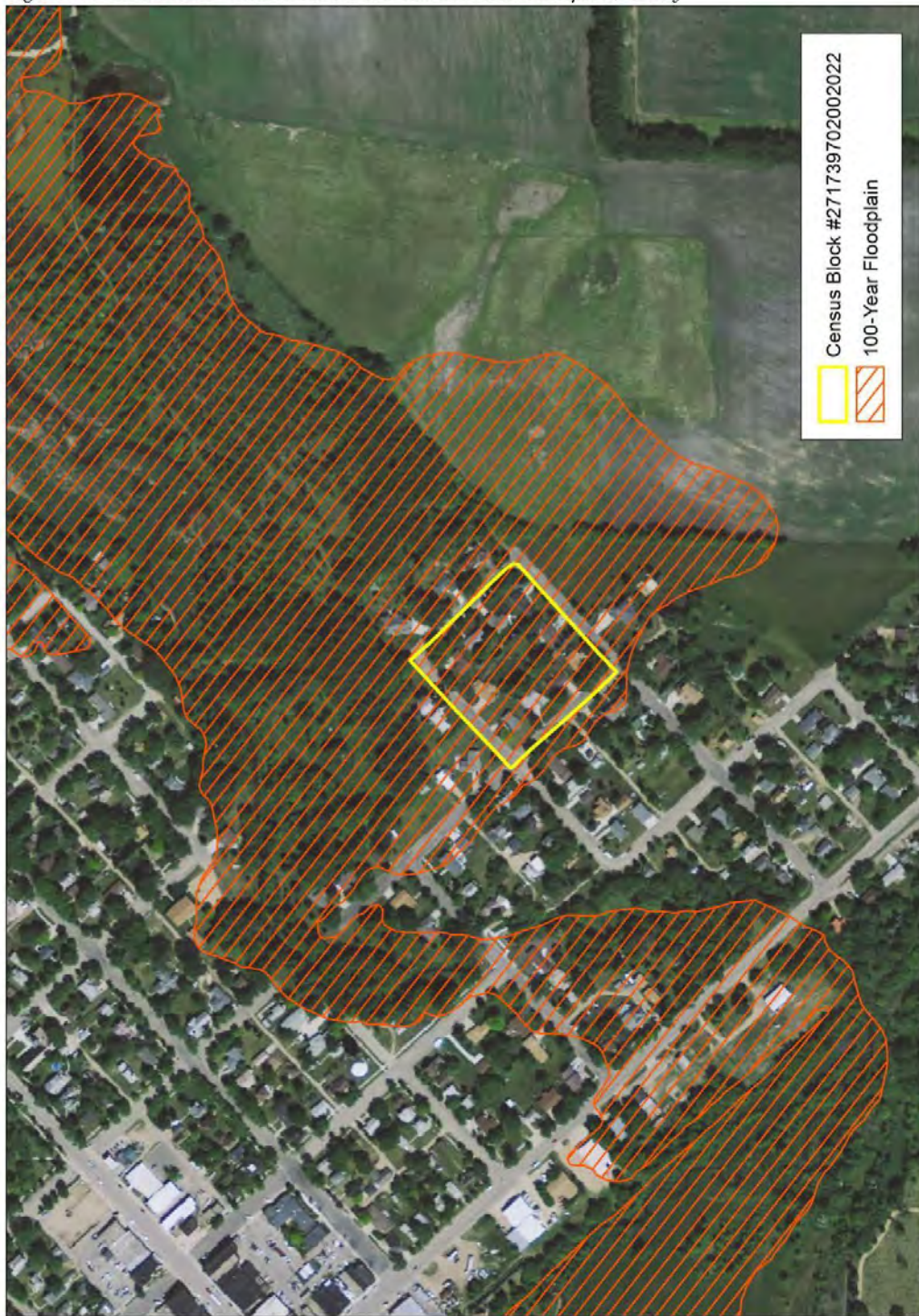


Figure 9. Census Block #271739701002008 and 100-Year Floodplain, Granite Falls



Figure 10. Census Block #271739702002022 and 100-Year Floodplain, Canby



Another analysis was performed by selecting the parcels with the highest values (building plus contents) that fell within the 100-year floodplain. The results of this analysis (and total building values) are shown in Table 3.

Table 3. Yellow Medicine County Properties with Highest Building/Contents Value Intersecting 100-Year Floodplain

Edited Parcel ID Number	Parcel Building + Contents Total Value	Class Description	Building Area (ft²)
15-008-4021	\$712,800	Agriculture	120,208
11-006-4010	\$622,000	Agriculture	6,190
06-026-1030	\$621,600	Agriculture	24,061
15-004-4020	\$612,400	Agriculture	9,556
20-034-3010	\$575,800	Agriculture	11,578
15-008-1021	\$563,600	Agriculture	29,134
15-010-4020	\$554,000	Agriculture	16,736
31-003-1070	\$514,600	General Govt Services	12,424
31-460-0228	\$441,750	Single Family Dwelling	6,382
11-032-2041	\$438,800	Agriculture	4,134
Total:	\$5,657,350		

Hazus-MH Essential Facility Loss Analysis

Essential facilities encounter the same impacts as other buildings within the flood boundary: structural failure, extensive water damage to the facility, and loss of facility functionality (i.e. a damaged police station will no longer be able to serve the community). One of the essential facilities (care facilities, fire stations, police stations, and schools) included in the Hazus-MH analysis falls within the 100-year flood boundary: the fire department in Canby, with loss of use expected (Figure 11).

Figure 11. Essential Facility in 100-Year Floodplain in Canby



Hazus-MH Shelter Requirement Analysis

Hazus-MH estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus-MH also estimates those displaced people that may require accommodations in temporary public shelters. The countywide 100-year flood model estimates 157 households may be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, the model estimates 127 people (out of a total population of 10,438) may seek temporary shelter in public shelters.

Hazus-MH Debris Generation Analysis

Hazus estimates the amount of debris that may be generated by the flood. The countywide 100-year flood model breaks debris into 3 general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 17,402 tons of debris may be generated. Of the total amount, Finishes composes 15% of the total and Structural composes 48% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 696 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Flood Hazard Analysis for Yellow Medicine County

*For Upper Minnesota Valley Regional Development Commission
Level II Flood Hazard Analysis performed using FEMA Hazus-MH*

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Wildfires

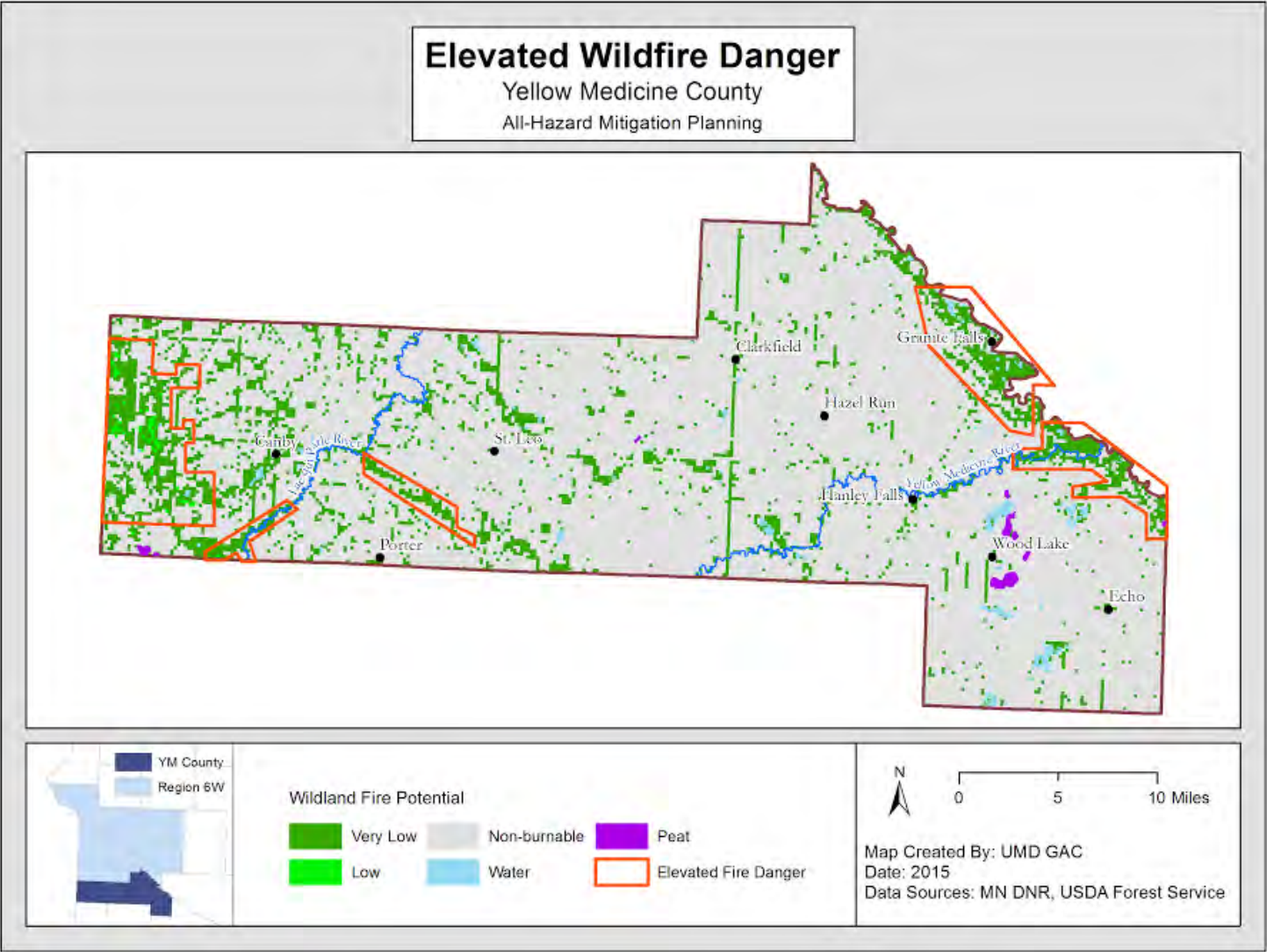
According to the Minnesota State Fire Marshal, there are more than 2,000 annual wildfires with an estimated loss of more than \$13 million dollars statewide. Every year, wildfires are started along the railroads and farmland. Three other potential wildfire hazards are power lines, utility structures, and timber bridges. Hot exhaust from farm equipment could also start fields on fire.

Yellow Medicine County currently has 17,540 acres enrolled in CREP, RIM, CRP and the Wetland Reserve Program. These areas are left for wildlife habitat and are not burned on a regular basis. As a result, years of dead grasses accumulate on these lands and are a fuel for a fire that may start. The Minnesota River Valley and the Wildlife Management Areas also provide an abundance of fuel for wildfires. Wildlife Management Areas occupy approximately 12,000 acres in Yellow Medicine County. Yellow Medicine County currently has 33,070 acres of grasslands and 16,085 acres of forests (Table 4.15). Figure 4.2 identifies five areas across the county, which contain large patches of grasslands (3,998 acres) and forests (4,274 acres). There are 147 farmsteads located within these five areas, as well as an additional 87 farmsteads within a half mile of these areas. These areas have low potential for wildfire but are the areas of greatest concern for Yellow Medicine County. The general locations include west and south of Canby, between Porter and St. Leo, and northeast and southeast of Granite Falls.

Table 4.15 YMC General Wildfire Information

Acreages	Grasslands	Forests
Acres in "Five Large Patch Areas"	3,998	4,274
Total Acres in County	33,070	16,085
Farmsteads located within:	Large Patch Areas	½ Mile of Large Patch Areas
Number of Farmsteads	147	234

Figure 4.2 Elevated Wildfire Danger in Yellow Medicine County



Dam Failure

Dam failure is defined as the collapse or failure of an impoundment resulting in downstream flooding. Dam failures can result in loss of life and extensive property damages. They may result from an array of situations, including flood events, poor operation, lack of maintenance and repair and terrorism. Yellow Medicine County has two major dams that could cause detrimental damage to Granite Falls and Canby. A dam failure has not occurred in Yellow Medicine County; however basic risk assessments for Granite Falls and Canby were completed based off Dam Contingency Plans for each city as a precaution. The plans are updated annually.

The Del Clarke Dam near Canby is owned and maintained by the Lac qui Parle – Yellow Bank Watershed District and has a spillway for flood events. The Watershed works with the U.S. Army Corps of Engineers and the Department of Natural Resources (DNR) to comply with all required regulations and permits. It is estimated that the total damage amount of dam failure near Canby would total approximately \$32,722,211 and could affect 320 parcels including residences (261), industrial businesses (4), two churches, two hazardous facility sites, and all educational buildings and government-owned utilities. See Figure 11 on page 36 for a visual of the estimated damage area.

The Granite Falls Dam is a "High Hazard Dam", which means there is potential for loss of human life if failure of the dam should occur. A dam break analysis was performed and was filed with the appropriate state and federal regulatory agencies. Maximum "Sunny Day Failure" was 5.2 feet with a stage increase of one foot or more between Granite Falls Dam and Minnesota Falls Dam. For a dam break at a 15-year event, stage increases were 2.0 feet or less. It is estimated that the total damage amount of dam failure in Granite Falls would total 37 properties, including 27 residences, 7 businesses, 2 government structures, and the Yellow Medicine County Museum, that would result in a total cost of \$2,637,168.

Dams

Yellow Medicine County
All-Hazard Mitigation Planning

Legend:

- Blue icon: Dam
- Green area: State Park

Scale: 0 5 10 Miles

Map Created By: UMD GAC
Date: 2015
Data Sources: MN DNR, NID

COMMUNITY BASED RISK ASSESSMENTS

In previous Yellow Medicine County All-Hazard Mitigation Plan updates, all cities underwent a broad risk assessment. Each community within Yellow Medicine County received a survey and two inventories to gather information to complete the project with the Emergency Manager. The risk assessment survey requested identification of likely hazards that may affect the community as well as current land use development trends and the potential of future development. The risk assessment inventories were geared toward identifying vulnerable structures that may be affected by different hazard area boundaries and an inventory of community assets. Sample surveys and inventories, as well as information included in the previous plan update are found in Appendix 11². Each community-based risk assessment was divided into four sections: existing development trends, potential of future growth and development vulnerability assessment of structures by hazard, and an inventory of community assets.

The task force had many discussions about the transportation of hazardous materials through the county during the 2015 Hazard Mitigation Plan update. Since the 2010 update, there has been an increase in crude oil transportation throughout western Minnesota coming from the Bakken Oil Fields in North Dakota. This is discussed in further detail in Hazardous Materials section of Chapter 3. It was determined that cities need to be aware of the areas of potential impact from a hazardous material spill. This section contains a map of each city in Yellow Medicine County with a ½ mile buffer around rail lines and U.S. and state highways. It is becoming increasingly important for cities to be cognizant of which of its critical facilities and major employers are located within this hazard zone. In addition to evacuation plans, cities should consider these zones when locating new schools, hospitals, emergency operations centers, etc.

An updated summary of existing development trends as well as potential for future growth and development for each city within Yellow Medicine County is provided below. The second portion of the city specific risk assessments includes land use information and an inventory of community assets for each city in Yellow Medicine County. Each city's asset locations were identified and placed on a map of the city as well as its respective transportation of hazardous material maps. This is to show the connection between hazard boundaries and the location of assets. Assets vary from community to community; so all assets were categorized into one of seven categories:

- Major Employers (as defined by community)
- Police Department
- Fire Department
- Hospitals
- Schools
- Historical Structures (as defined by community and State Historic Preservation Office)

² Yellow Medicine County did not have access to data more recent than 2009. Therefore, outlined is the total number of parcels within each land use category and a 2009 market rate value for the parcel for all non-exempt entities. All exempt parcels including hospitals, churches, government-owned facilities, and schools, have market values from 2004 as those properties are only assessed once every six years. It is important to note that Yellow Medicine's survey underestimates the actual number of structure within each community. Further, the market value utilized for the community-based risk assessment is for both the structure and the land, which causes an over-estimation of structure value.

- Institutional Buildings (government-owned structure, not related to Emergency Services)
- Multi-Family Housing
- Public Facilities (Park, Pool, General Public Asset – in Canby, MN)
- Schools (Educational-related structure).

For the next update of the All-Hazard Mitigation Plan, the market value for exempt properties should be updated with more recent assessment values and will include updated square footage numbers. Some properties selected as Community Assets did not have accurate square footage measurements.

City of Canby, Minnesota

Existing Development Trends

According to the Minnesota State Demographic Center, the City of Canby had an estimated population of 1,759 residents and 783 households in 2013. The City of Canby is the second largest city in Yellow Medicine County. The decade of greatest population decline occurred between 1980 and 1990. During this time the population decreased by 14%. The population grew slightly between 1990 and 2000 (U.S. Census Bureau). In the past 10 years, Canby's economy has remained stable. Growth within Canby has for the most part occurred north of the city, with the addition of agricultural land to the city proper and converting that land to single-family residential. The city had extended its sewer lines north to promote residential growth. In addition to residential development, a former mobile home park area was rezoned as commercial/industrial. The City of Canby's general land use category breakdown is provided in Table 4.16.

Table 4.16 City of Canby – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	791	70.18%
Commercial	146	12.95%
Agricultural	11	1.00%
Public Institutions	67	5.94%
Religious	16	1.42%
Industrial	14	1.24%
Parks	3	0.27%
Other	79	7.00%
Total	1,127	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

Canby's future growth areas for development were identified in Canby's Comprehensive Plan. Areas slated for future annexation and development are located directly north and northwest of the city, and are currently utilized for agricultural purposes. North of the city, Canby intends to promote future residential development and in the northeast the city will focus on industrial business growth. Other future prospects for growth include focusing on infill development and converting land in the southeast corner for residential development. The development sites are not specifically located in a hazard area, but would likely be affected by a city or county-wide event.

Figure 4.4 Canby Land Use

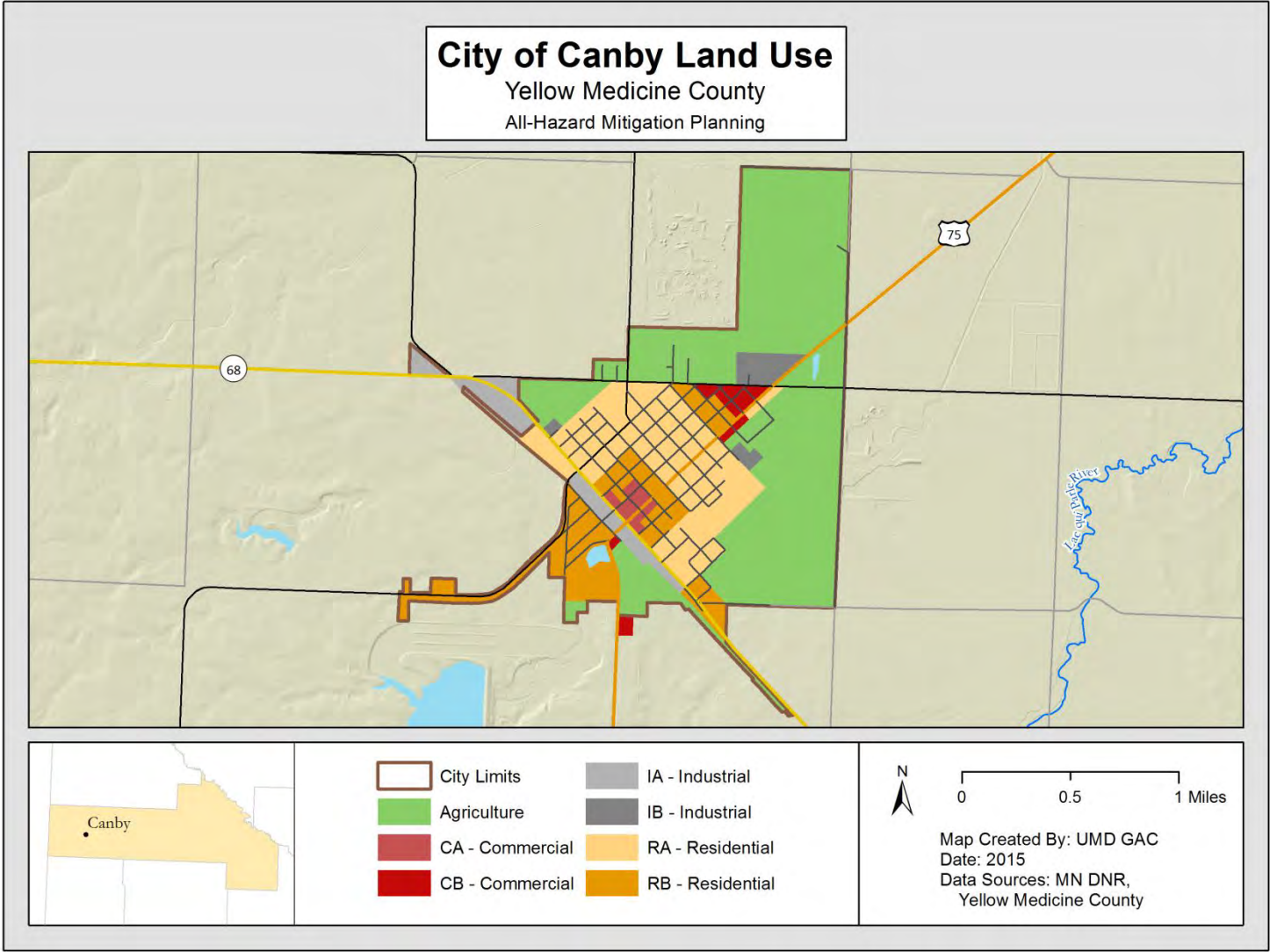


Figure 4.5 Canby Community Assets/Critical Facilities

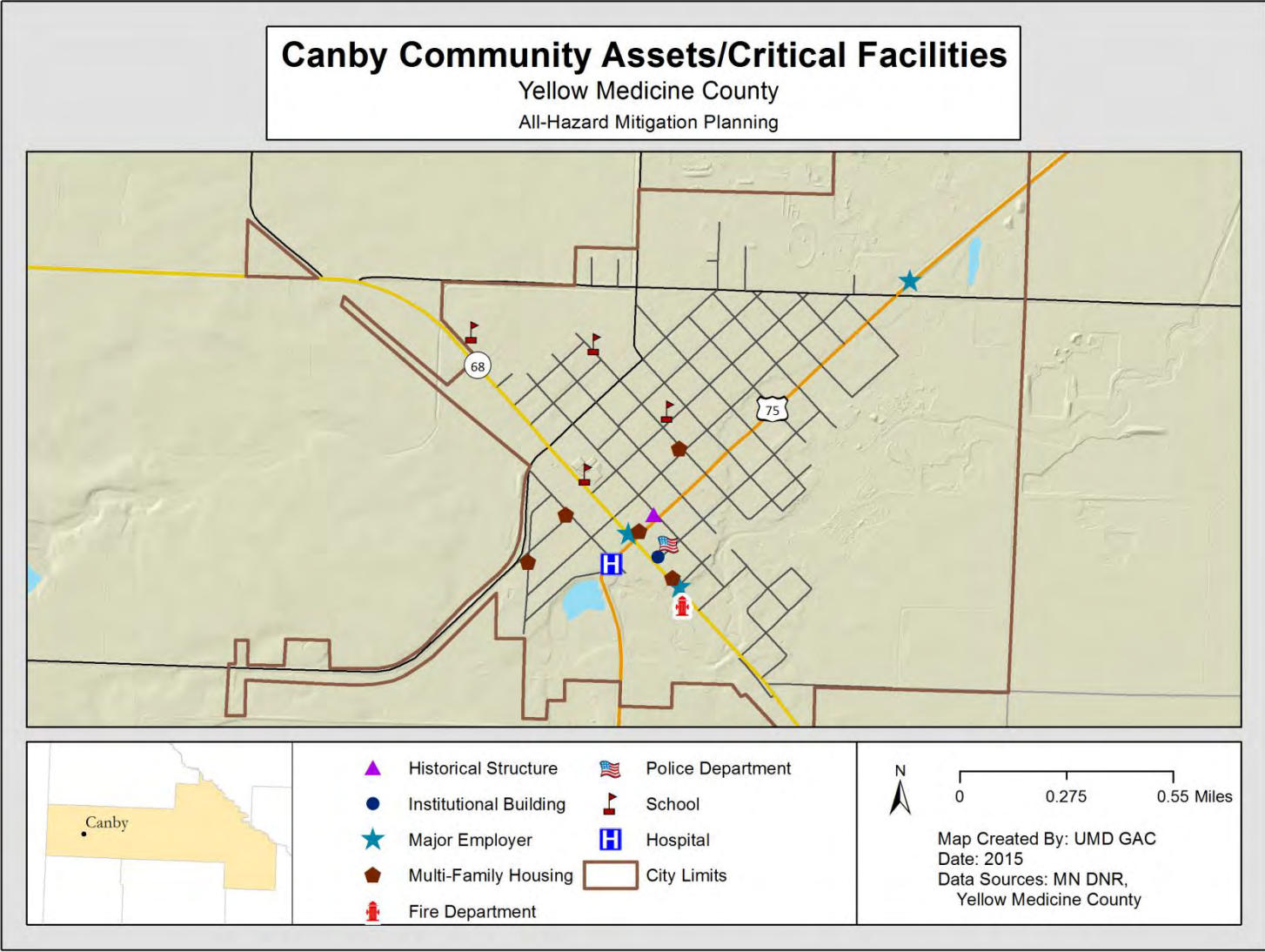
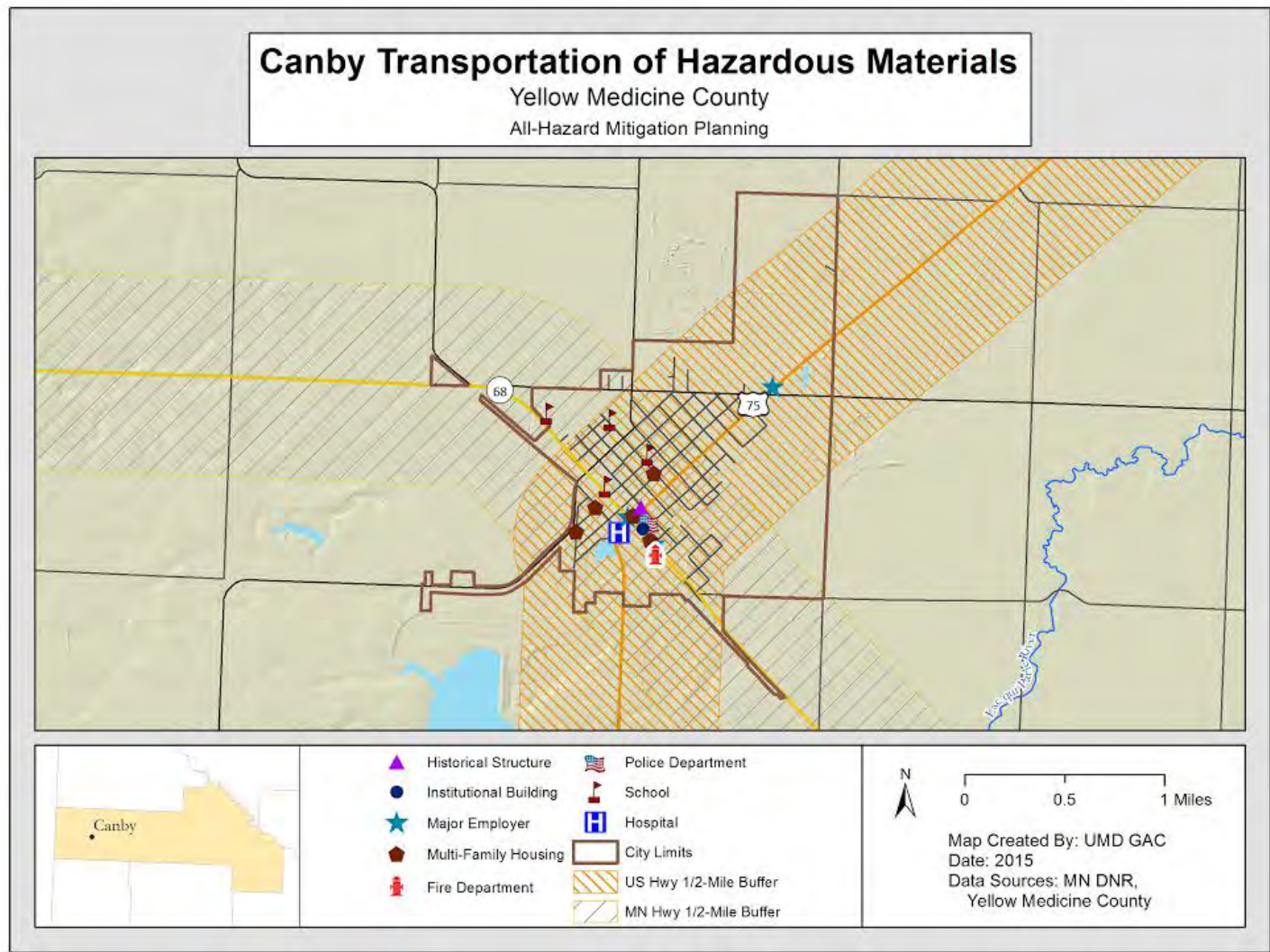


Figure 4.6 Canby Transportation of Hazardous Materials



City of Clarkfield, Minnesota

Existing Development Trends

According to the Minnesota State Demographic Center 2013 population estimates, the City of Clarkfield has 833 residents and contains 363 households making it the third largest city in the county. Clarkfield saw a steady population decline between 2000 and 2010, which has continued over the past few years. Clarkfield's economy has remained stable. In 2006, the City annexed two parcels (6.57 and 11.79 acres) of agricultural land and later rezoned them for industrial development. In 2007, a 12-acre parcel was converted from a commercial property to a school and Clarkfield's Emergency Service Center was created from a remodeled bus garage. Later in 2009, a swath of agricultural land 400 feet by 1,320 feet (528,000 square feet) was annexed and remains today as agricultural. Aside from two mentioned redevelopment projects, no other land use changes or redevelopments have occurred in Clarkfield in the last 10 years. The City of Clarkfield's general land use category breakdown is provided in Table 4.17.

Table 4.17 City of Clarkfield – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	425	75.89%
Commercial	71	12.68%
Agricultural	18	3.21%
Government	25	4.46%
Religious	7	1.25%
Industrial	7	1.25%
Education	7	1.25%
Total	560	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

Clarkfield's future growth area for development was identified as the south-central portion of the City along new County Highway 24, known as the Industrial Park. The majority of the property (63.7 acres) was purchased and annexed in 1996, with an additional 22.66 acres purchased and annexed in 2005. The purpose of these land purchases was to provide space to build a new county road. Another annexation of land located south of the new county road will occur in the near future. This development site not specifically located in a hazard area, but would likely be affected by an event that would desolate the entire community or a county-wide hazard event. This land is located one block east of Highway 59 and begins across the street to the south of the railroad tracks.

Figure 4.7 Clarkfield Land Use

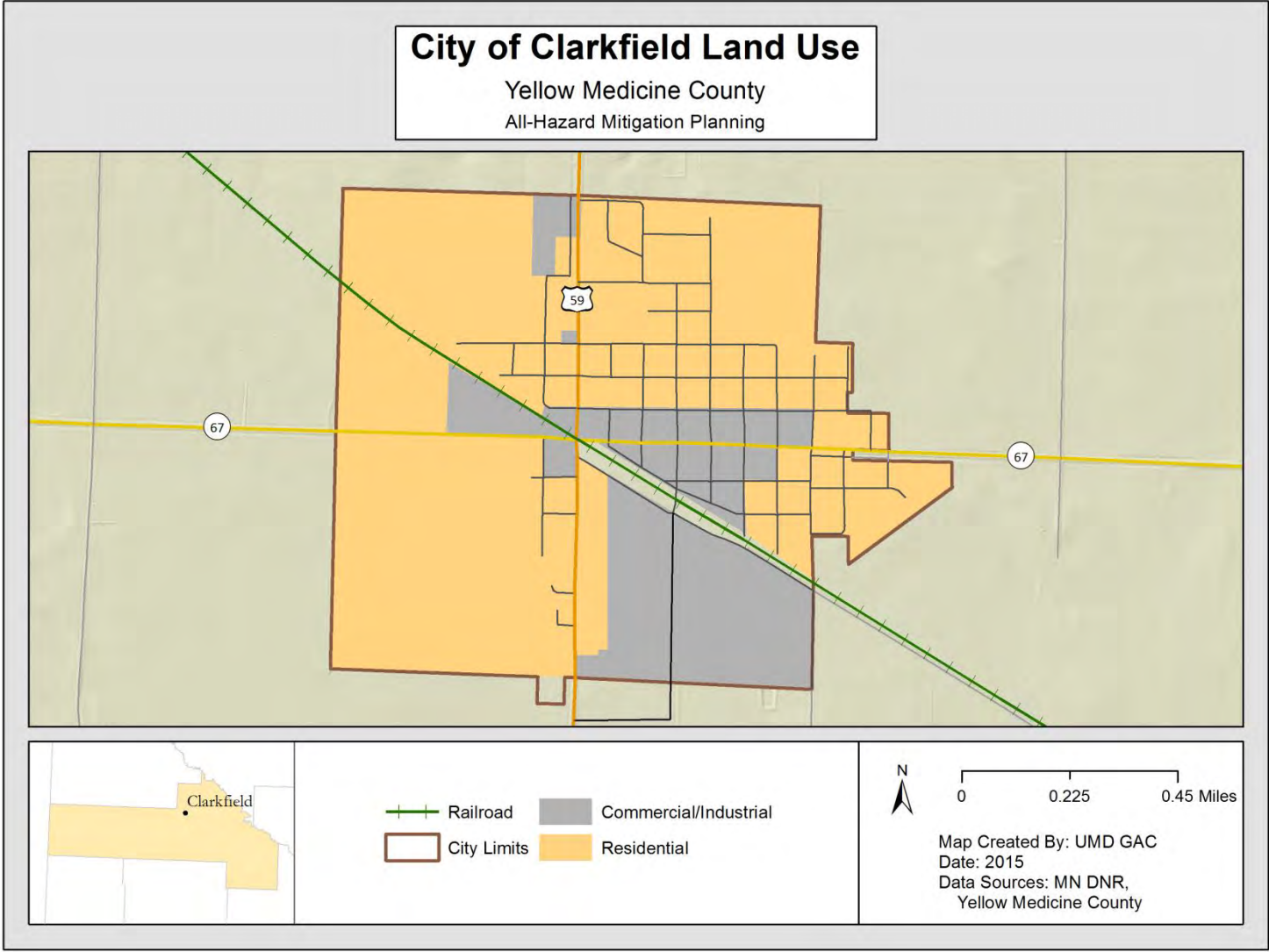


Figure 4.8 Clarkfield Community Assets/Critical Facilities

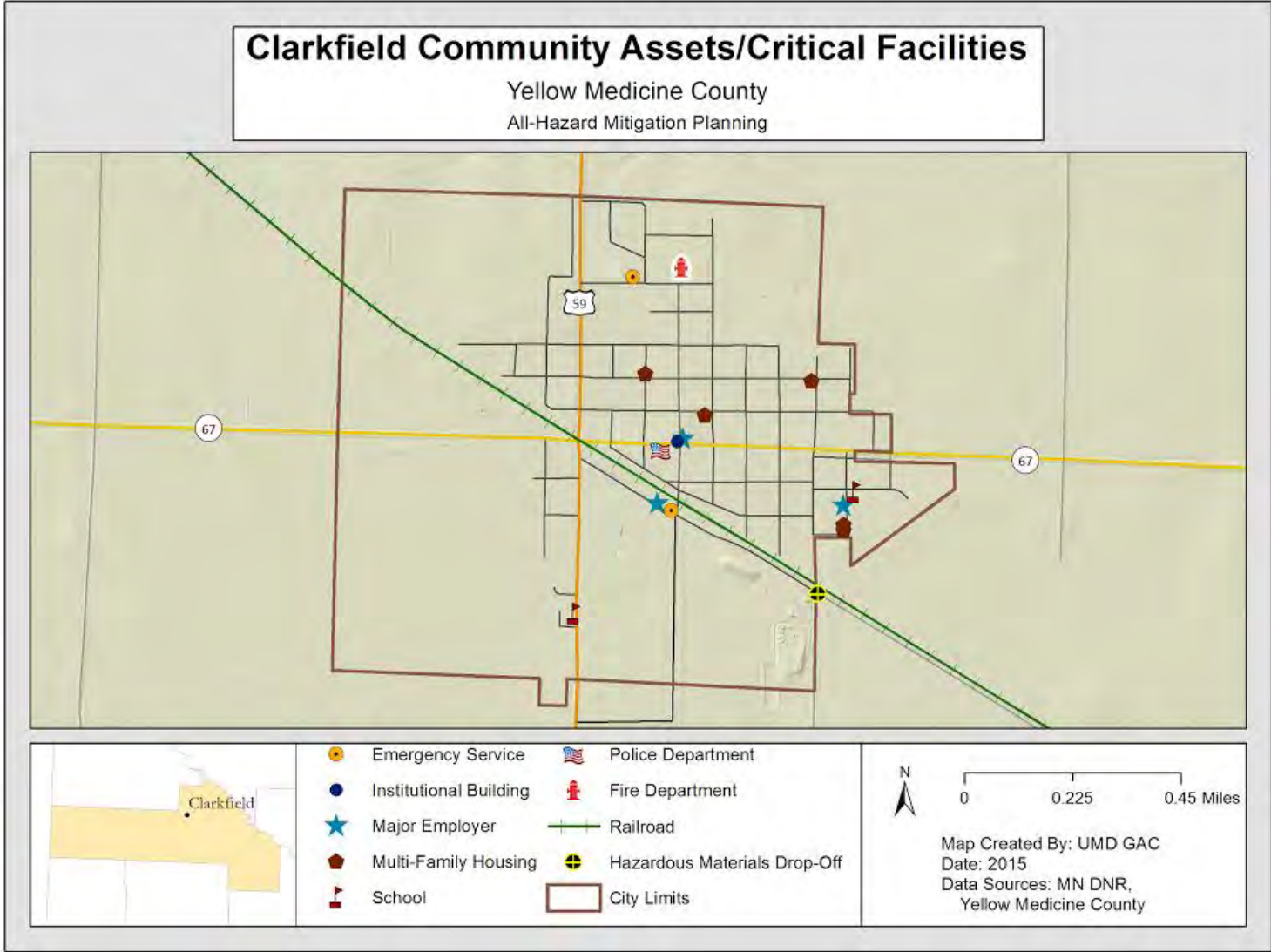
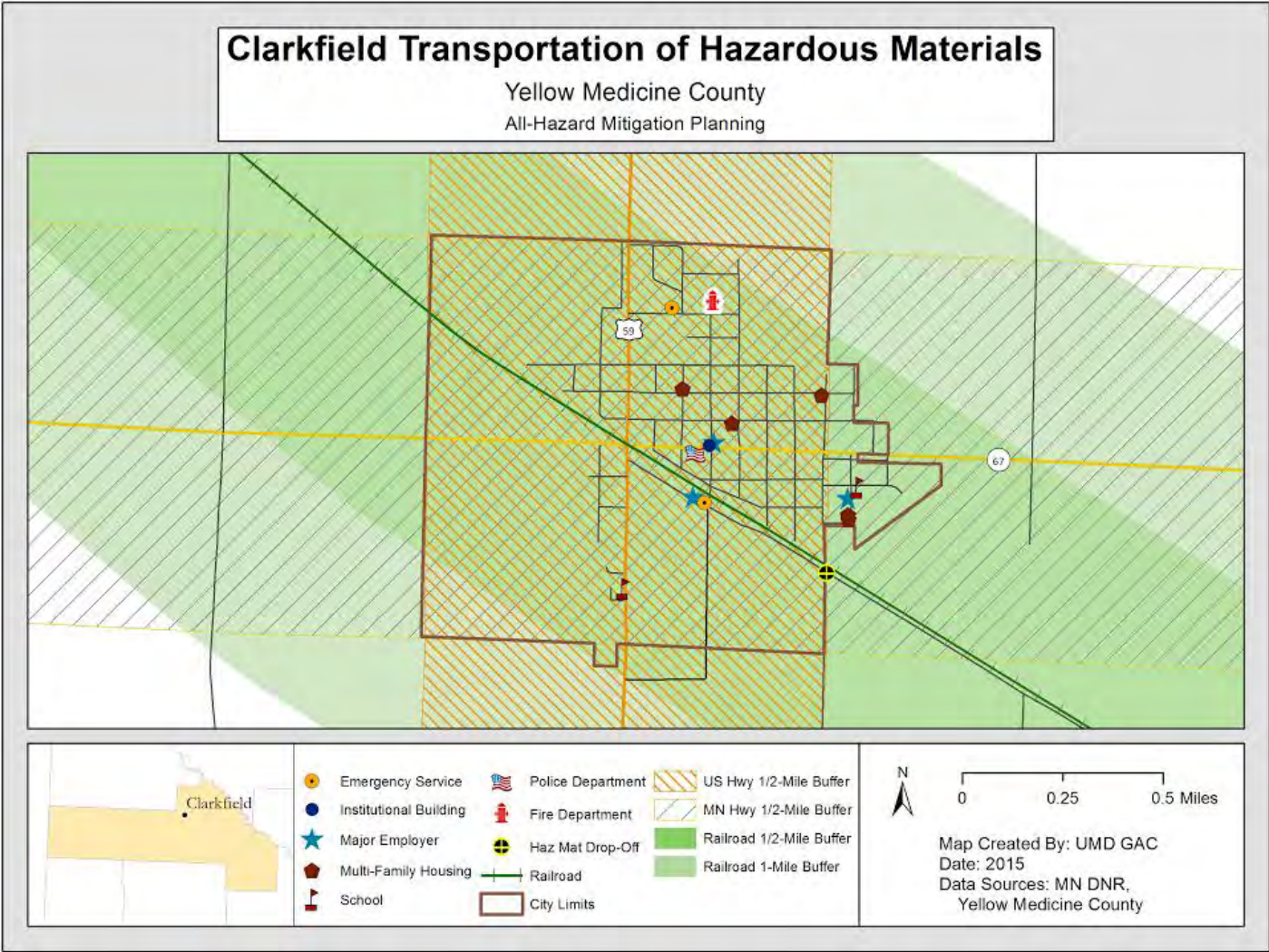


Figure 4.9 Clarkfield Transportation of Hazardous Materials



City of Echo, Minnesota

Existing Development Trends

According to the Minnesota State Demographic Center, the City of Echo's population was 269 in 2013 and contains 109 households. The City of Echo is the southern-most community in Yellow Medicine County. As noted in chapter 2, Echo has experienced a general decrease in population from 1970 to 2000, averaging a loss of approximately 9% percent in population and 11% in households every ten years. From 2000 to 2010, the City of Echo maintained a population of 278. Over the past decade, Echo's economy has remained stable and the city has not annexed any land. One redevelopment project occurred in the City converting a bank to a taxation office; however the land use category remained commercial throughout the project. In 2012, the City of Echo annexed out 3 parcels of land, totaling 408.83 acres. The City of Echo's general land use category breakdown is provided in Table 4.18.

Table 4.18 City of Echo – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	139	66.19%
Commercial	25	11.90%
Agricultural	8	3.81%
Government	18	8.57%
Religious	5	2.38%
Industrial	5	2.38%
Total	210	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

The City of Echo created an intensive Future Growth Map identifying numerous areas within the city for housing, commercial, industrial, and a future annexation area. It is important to note that all of the growth areas are located within Echo city limits. The majority of housing growth areas are found in the central and western portion of the City. The location of commercial growth areas are 5 parcels along Second Avenue (Main Street) and along South Avenue (County Rd. 1) in the southern portion of the City, abutting the largest industrial growth area along the Chicago and Northwestern Railroad. The final industrial growth area encompasses two large parcels along the railroad in southern Echo. The future annexation area is located west of State Highway 67, which is currently slated for agricultural use. All of the future growth sites are within hazard areas for transportation of hazardous materials and tornados.

Figure 4.10 Echo Land Use

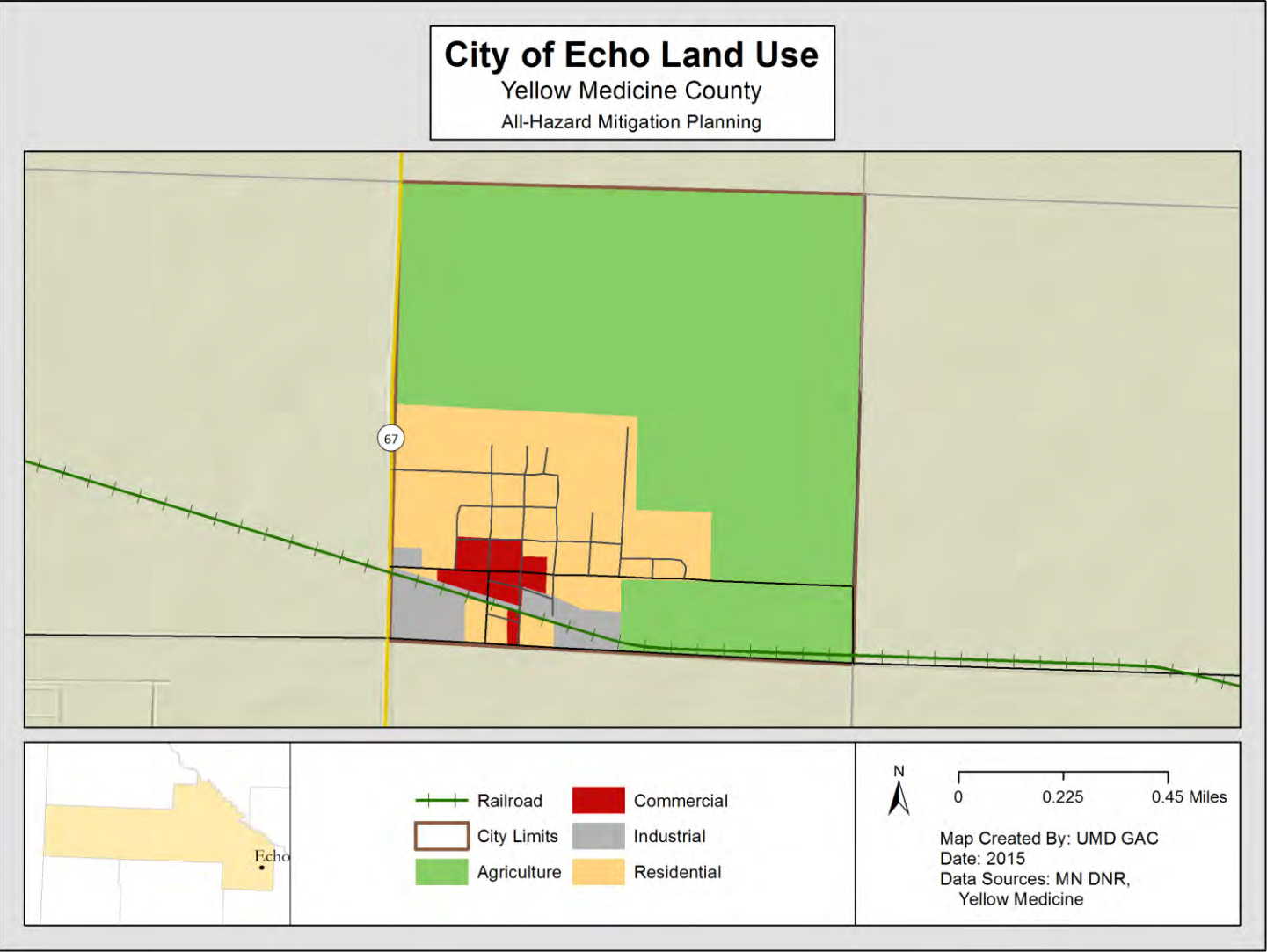


Figure 4.11 Echo Community Assets/Critical Facilities

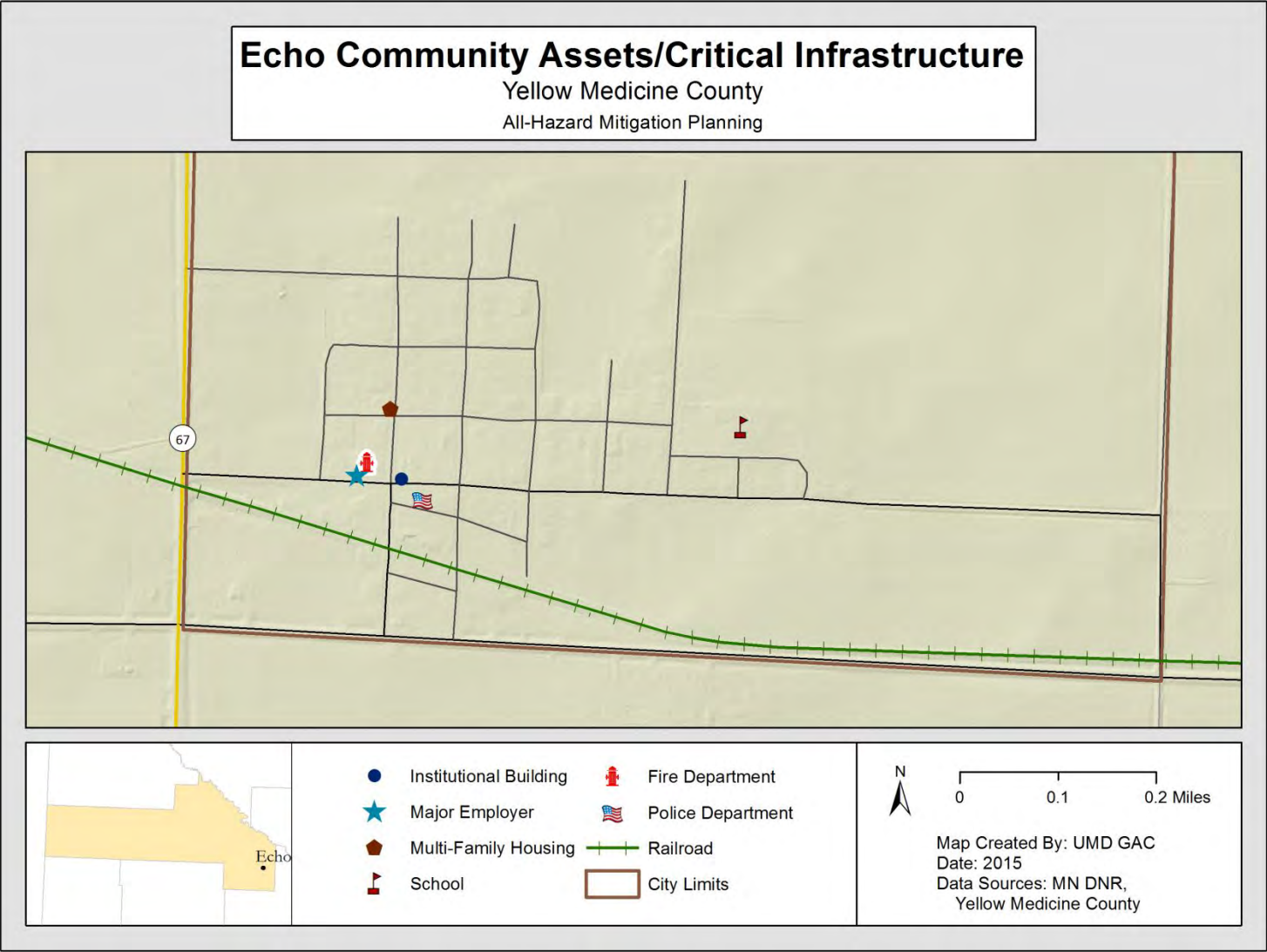
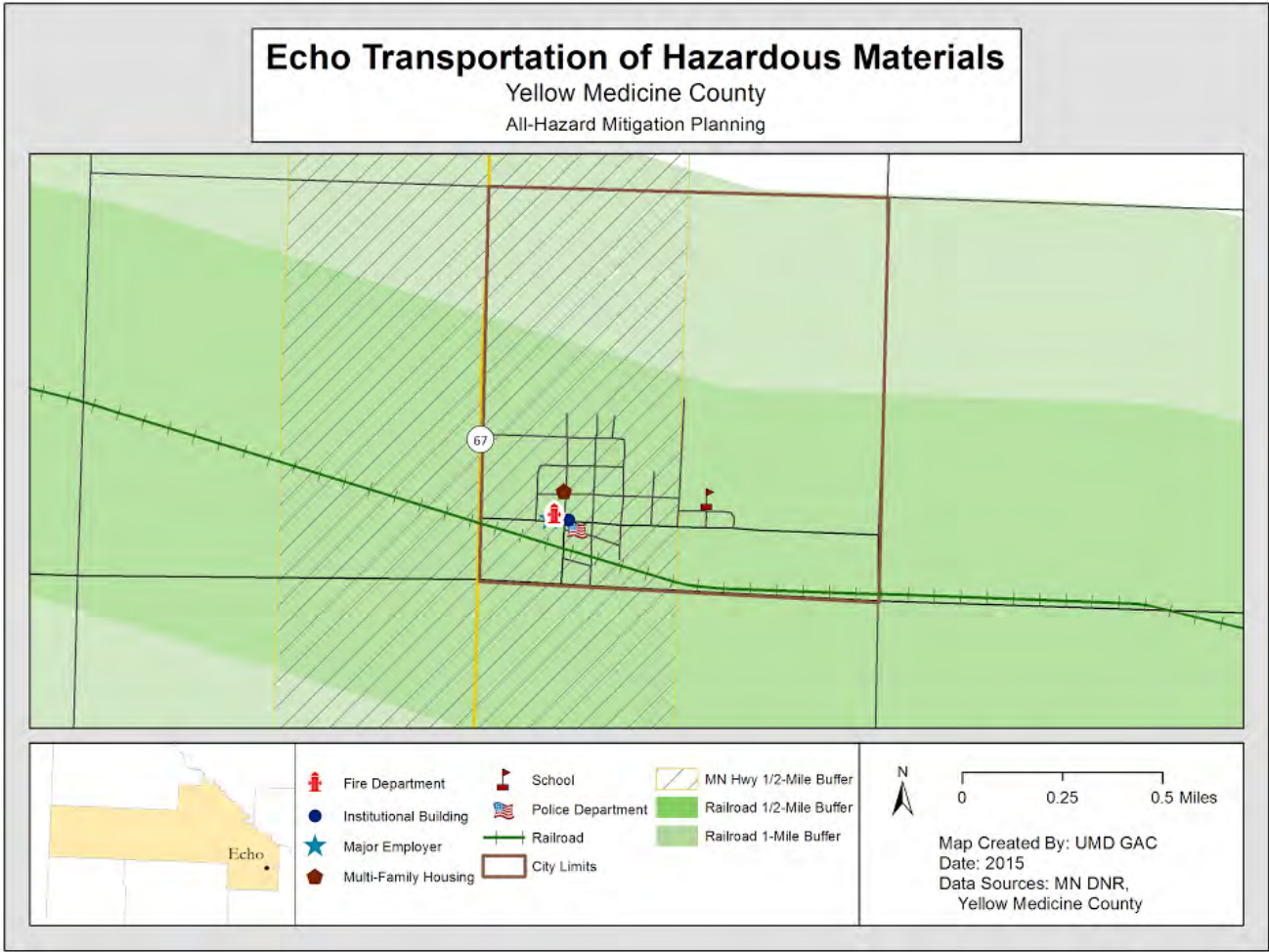


Figure 4.12 Echo Transportation of Hazardous Materials



City of Granite Falls, Minnesota

Existing Development Trends

According to the Minnesota State Demographic Center, the City of Granite Falls had an estimated population of 2,832 in 2013 and contains 1,267 households, making it the largest city in Yellow Medicine County. Granite Falls is also the Yellow Medicine County seat. The population trends, noted in Chapter 2: Community Profile for the City of Granite Falls, illustrated a general decrease in population and number of households from 1980 to 2010, with a 10% population loss from 1980-1990, and another decrease from 2000 to 2010 of just over 5%.

Throughout the past decade, Granite Falls annexed 20 acres of land converting agricultural land into both industrial and residential land uses. The new industrial land was utilized to build a new ethanol plant for the City. The City has had many redevelopment projects, especially in the 100-year floodplain, where commercial businesses were acquired, removed, and relocated and previous residences now act as green space. Some commercial facilities have been redeveloped into governmental buildings and a 500 foot runway extension was added to the airport in 2005. In 2009, the Granite Falls City Hall was relocated from the 100-year floodplain to downtown Granite Falls. The general trend for Granite Falls resides in commercial and residential development. The City of Granite Falls general land use category breakdown is provided in Table 4.19.

Table 4.19 City of Granite Falls – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	1,310	73.55%
Commercial	182	10.22%
Agricultural	46	2.58%
Government	77	4.32%
Religious/Charitable	18	1.01%
Education	8	0.45%
Industrial	12	0.67%
Total	1,781	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

The City of Granite Falls Comprehensive Plan identifies growth areas east of the City along County Road 38 for a future industrial park. On the western edge of the City, a combination of high density residential and commercial development is hoped to occur within the Stony Run Addition. Neither of these proposed development sites are within 100-year floodplains. The dominant trend of future development within the City focuses on industrial with some commercial and high density residential.

Figure 4.13 Granite Falls Land Use

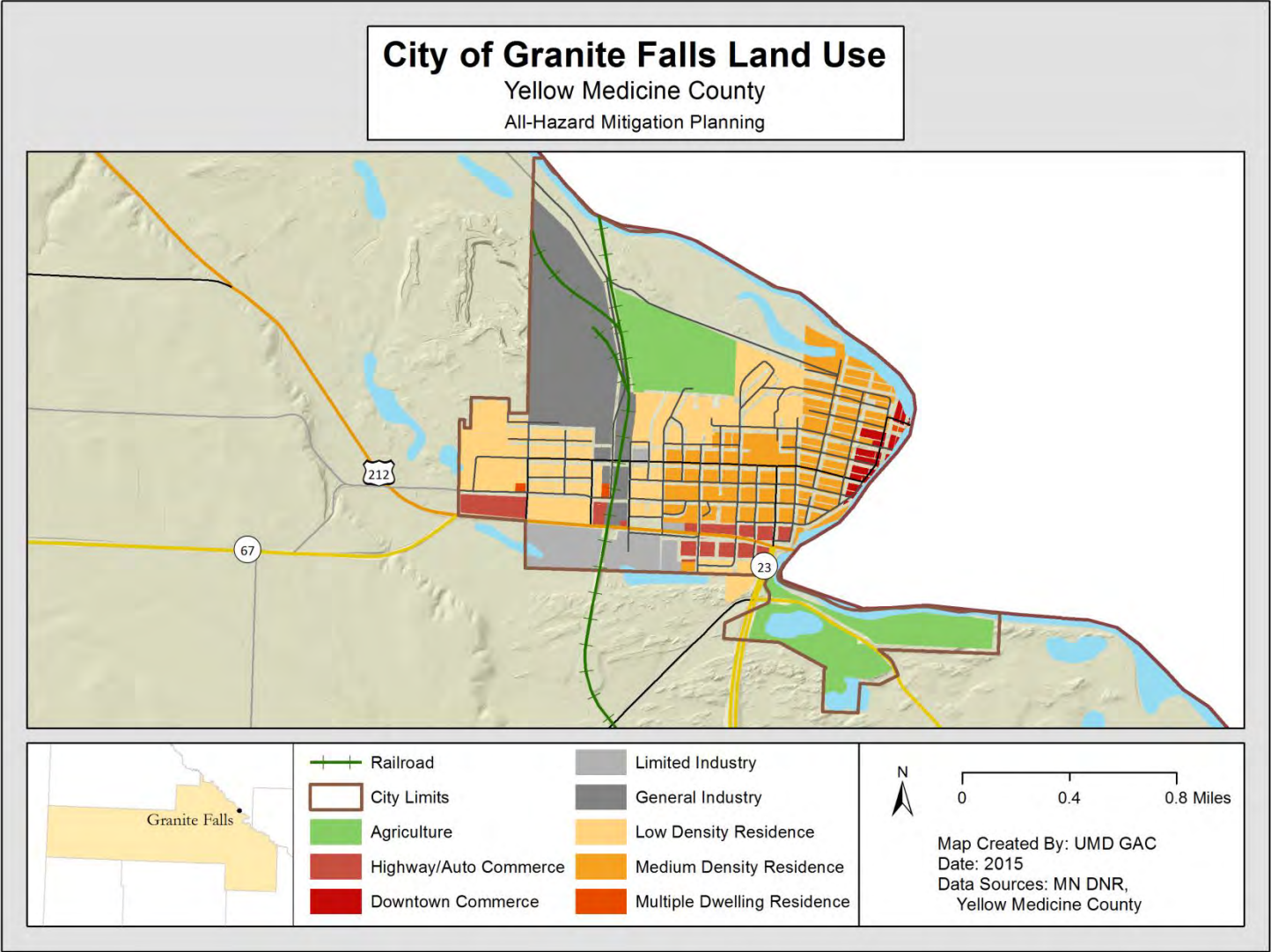


Figure 4.14 Granite Falls Community Assets/Critical Facilities

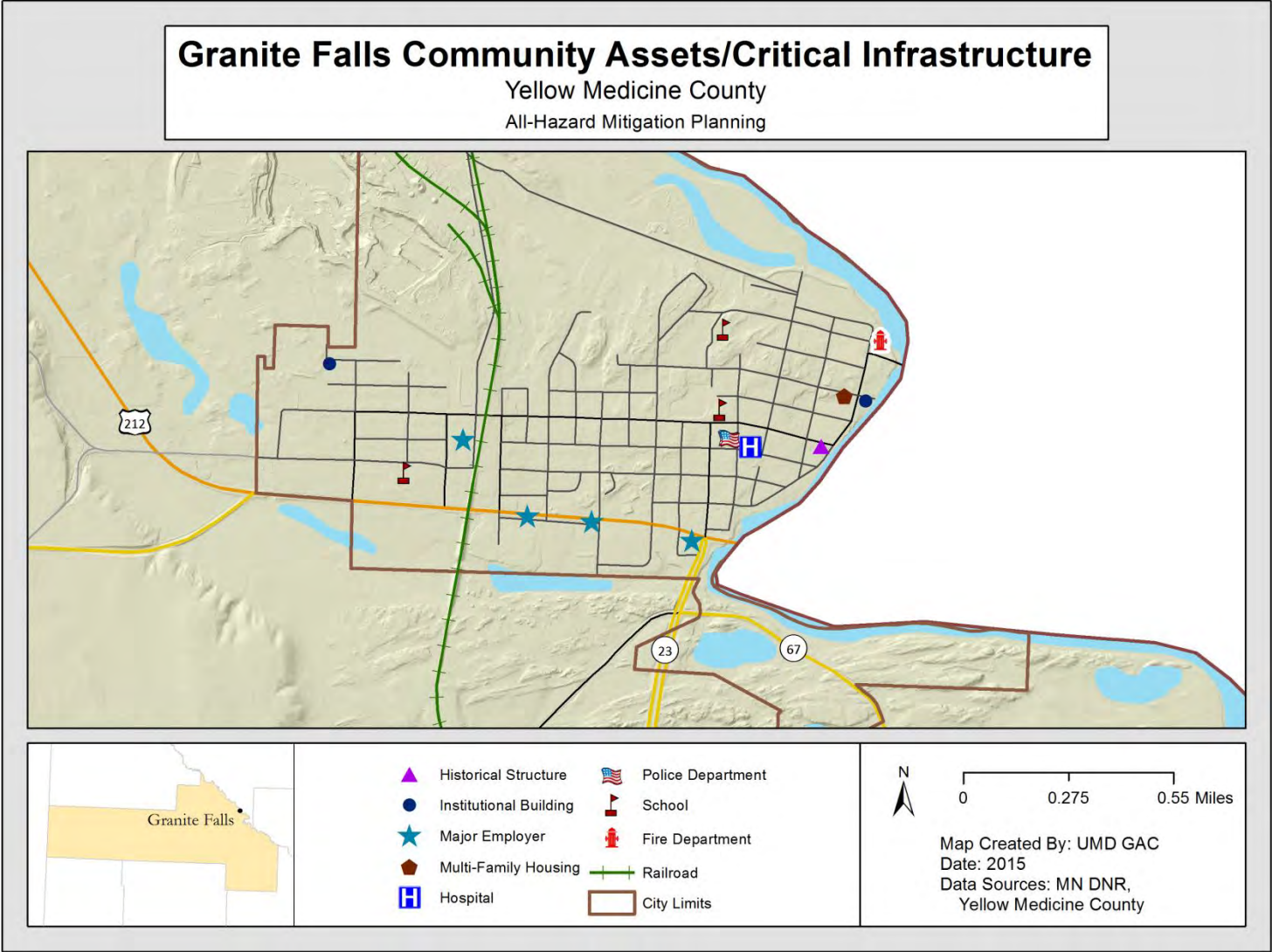
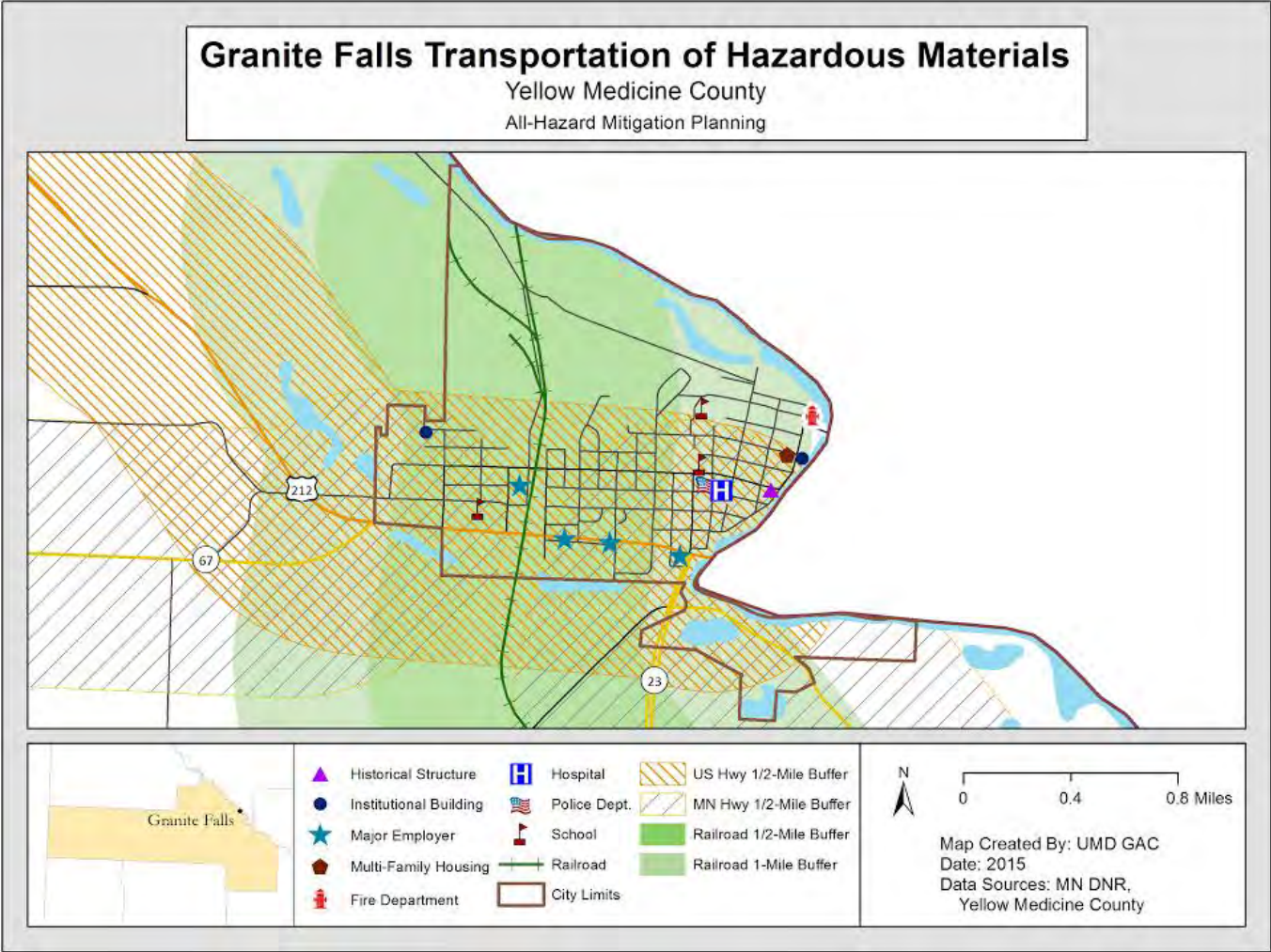


Figure 4.15 Granite Falls Transportation of Hazardous Materials



City of Hanley Falls, Minnesota

Existing Development Trends

According to U.S. Census Bureau, the estimated 2013 population for the City of Hanley Falls was 293 and contains 104 households. The population trends noted in Chapter 2: Community Profile for the City of Hanley Falls illustrates an interesting demographic shift from 1990 to 2000, with a population increase of 3% from 246 to 323 and a decrease from 2000-2010 (304 persons). The overall number of households from 1980 to 2008, has remained relatively stable shifting between 117 (1980) to 109 (2013).

Throughout the past decade, the economy of Hanley Falls has remained stable and the city has not annexed any land. Two land developments occurred turning vacant commercial land into a municipal water treatment plant in March of 2007 and a Fire Hall in 2009. Finally, in the past three years, two parcels of agricultural land were converted to residences. Hanley Falls has two small areas of 100-year floodplains located within city limits. The land use associated with the floodplains is agricultural and no future development is slated for the floodplain areas. The City of Hanley Falls' general land use category breakdown is provided in Table 4.20 below.

Table 4.20 City of Hanley Falls – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	139	73.16%
Commercial	19	10.00%
Agricultural	2	1.05%
Government	23	12.11%
Religious	5	2.63%
Industrial	2	1.05%
Total	190	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

The City of Hanley Falls has designated two areas for future growth. Industrial growth is slated to occur south of the City with housing supported west of Hanley Falls. The City is currently built out and new lands will be necessary to encourage future development. All of the future sites are within the tornado hazard area.

Figure 4.16 Hanley Falls Land Use

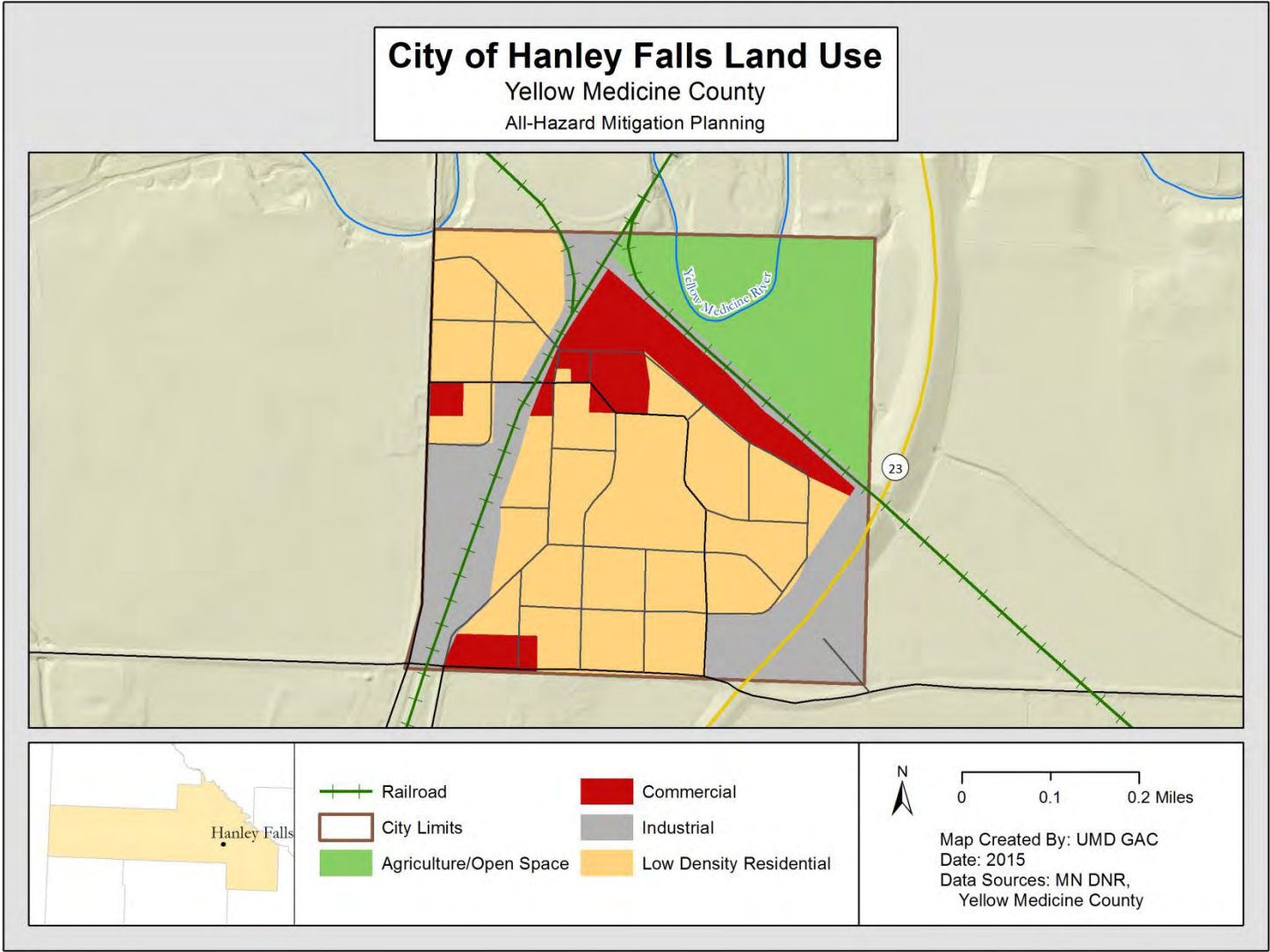


Figure 4.17 Hanley Falls Community Assets/Critical Facilities

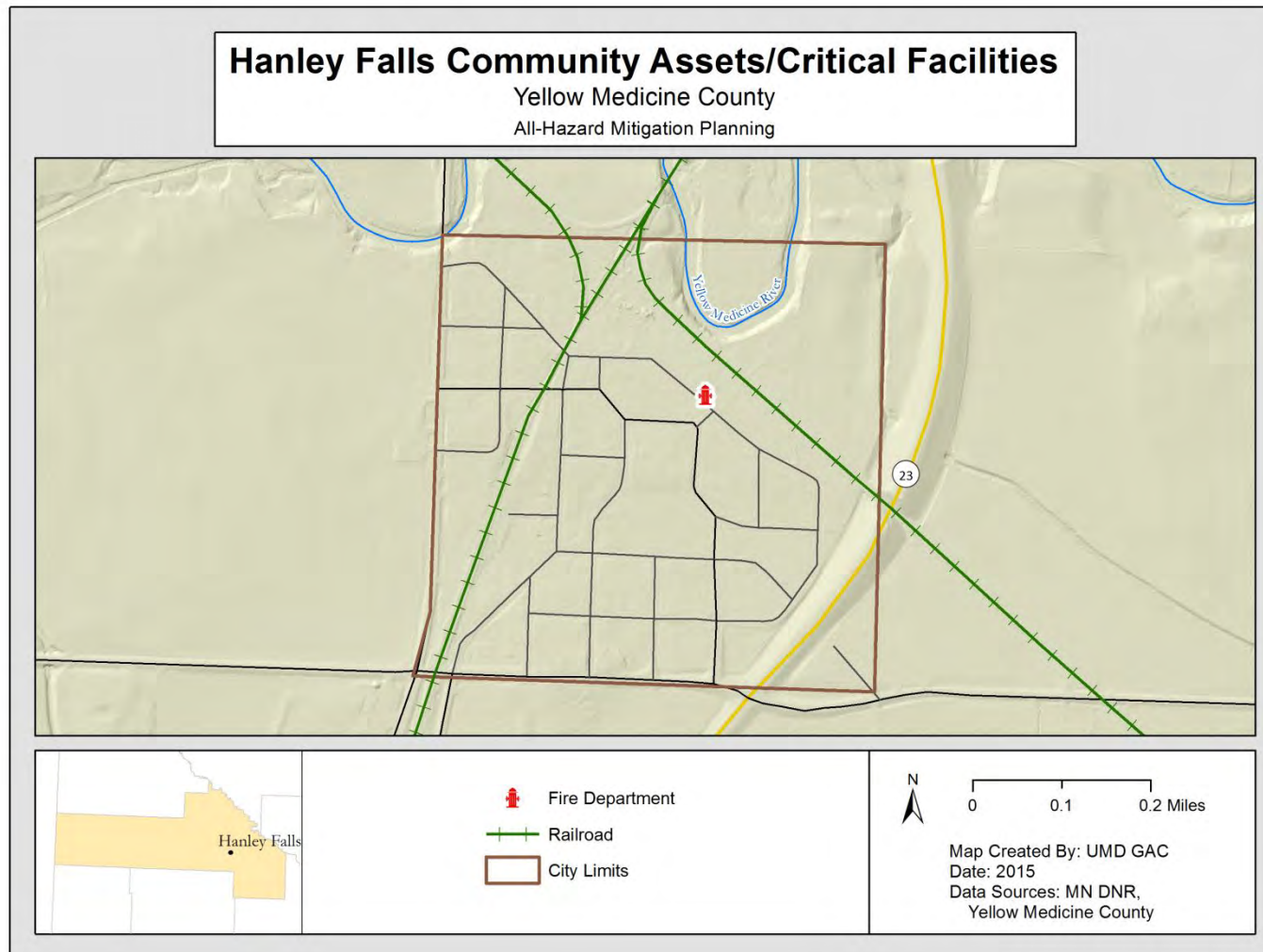
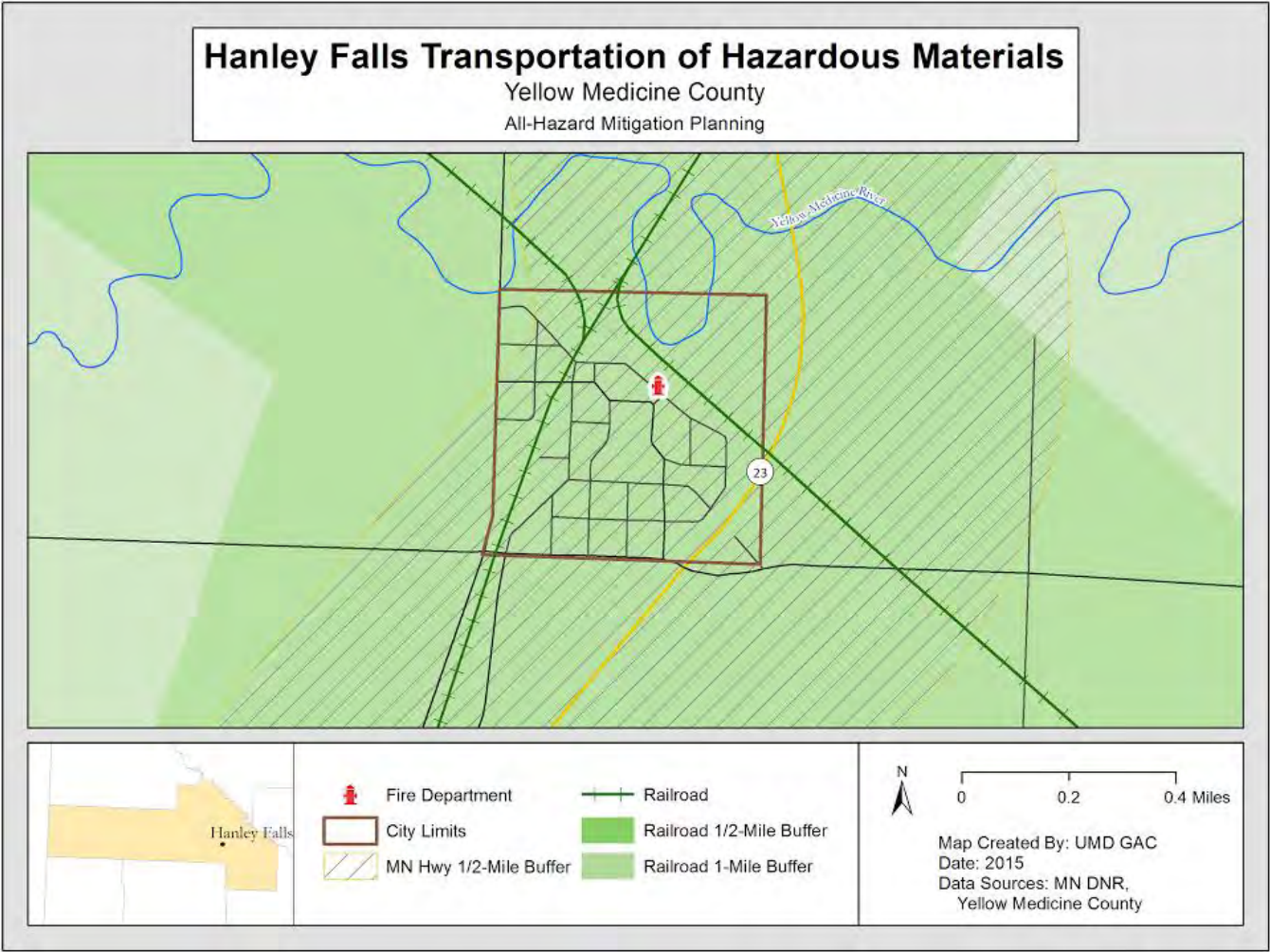


Figure 4.18 Hanley Falls Transportation of Hazardous Materials



City of Hazel Run, Minnesota

Existing Development Trends

According to Minnesota State Demographic Center, the 2013 population estimate of the City of Hazel Run was 61, containing 27 households. The population and number of households in Hazel Run decreased from 1970 to 2010, with the greatest population losses occurring from 1970 to 1980 (19%), and from 1990 to 2000 (21%). The population appears to have stabilized from 2000 to 2013, with a loss of 3%. Throughout the past decade, Hazel Run's economy has remained stable. The city has not annexed any land, nor have any development/redevelopment projects occurred. The general land use category breakdown is provided in Table 4.21 below.

Table 4.21 City of Hazel Run – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	35	48.61%
Commercial	11	15.28%
Agricultural	12	16.67%
Government	8	11.11%
Religious	4	5.56%
Total	72	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

The City of Hazel Run does not have a specific future growth plan. The community is focused on citizen and business retention. Hazel Run would like to increase population and housing units as well as create new business opportunities.

Figure 4.19 Hazel Run Land Use

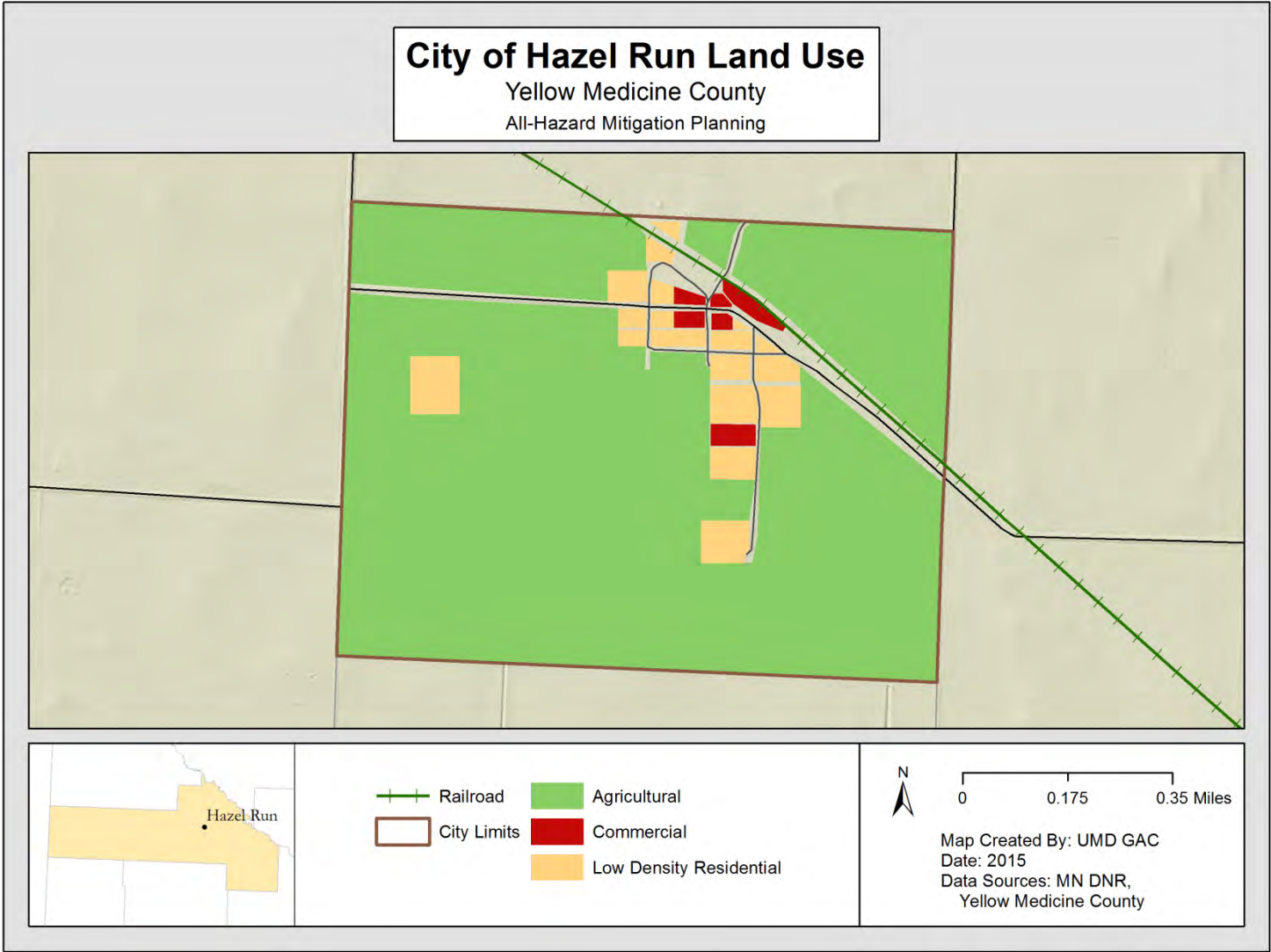


Figure 4.20 Hazel Run Community Assets/Critical Facilities

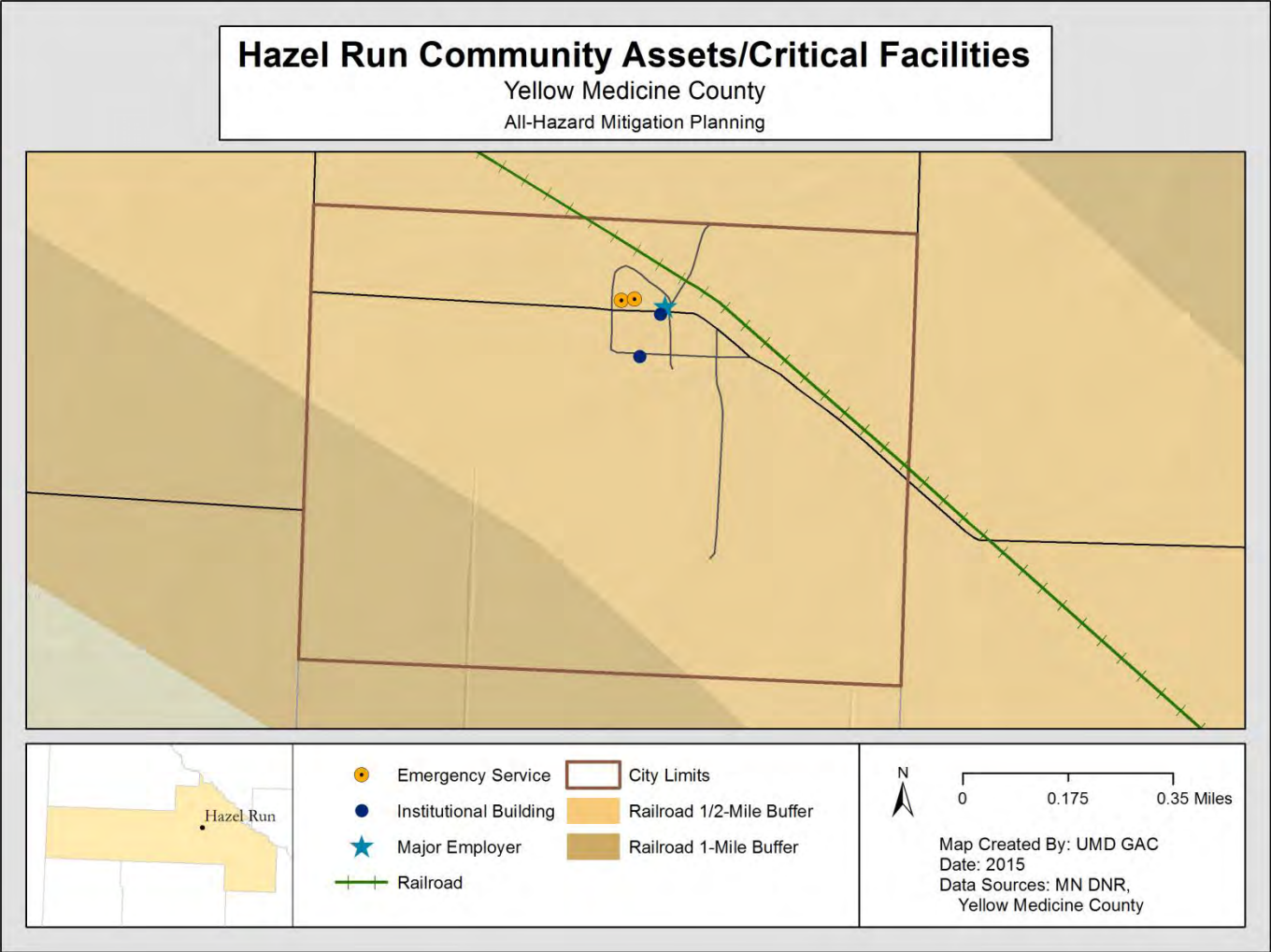
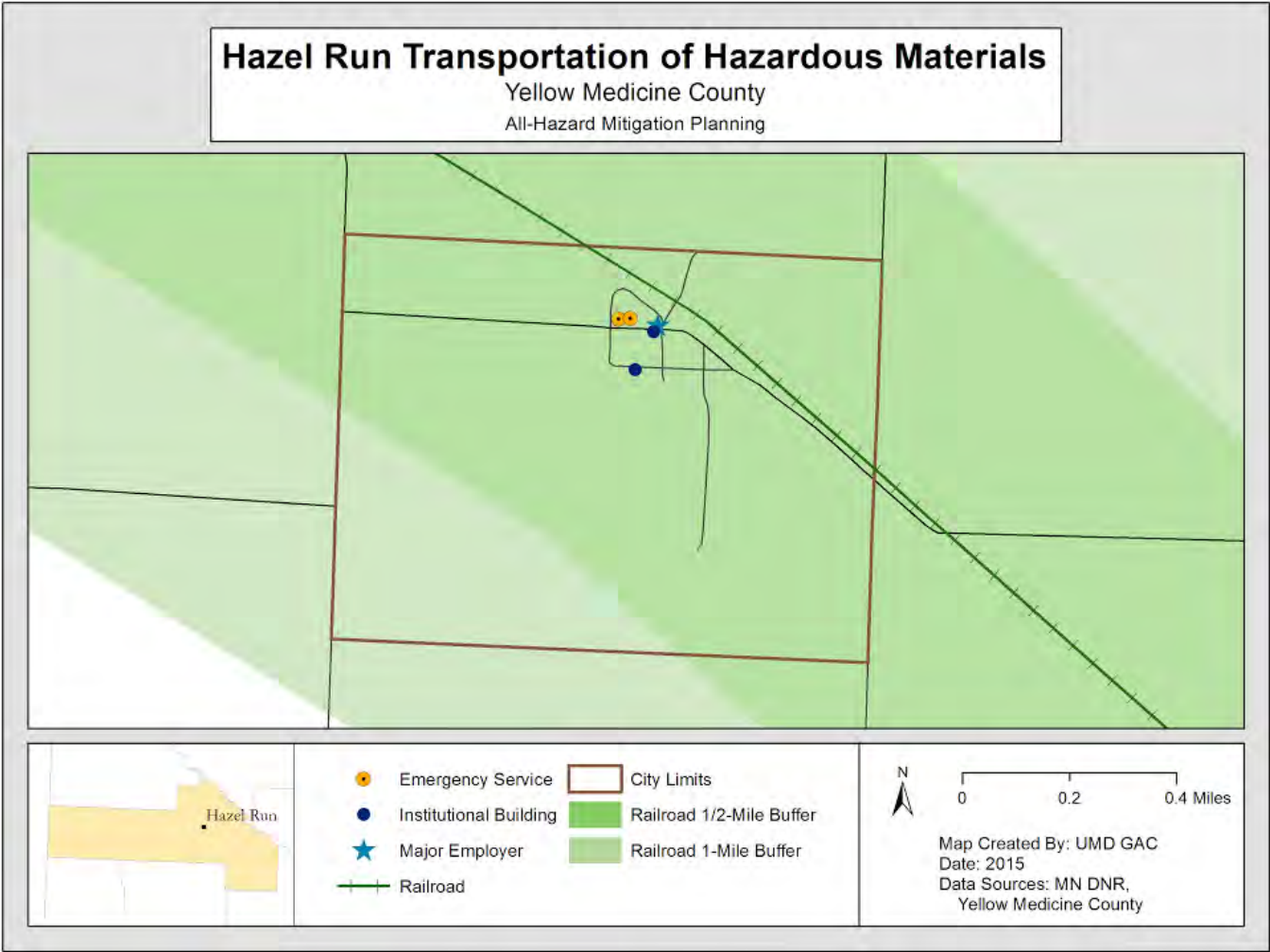


Figure 4.21 Hazel Run Transportation of Hazardous Materials



City of Porter, Minnesota

Existing Development Trends

According to the Minnesota State Demographic Center, the City of Porter had an estimated population of 180 residents and contained 85 households in 2013. The population trends noted in Chapter 2: Community Profile for the City of Porter illustrates a steady decrease from 1980 to 2008, with the first large decrease from 210 persons to 190 (10.5%) between 1990 and 2000.

Throughout the past decade, Porter's economy has remained stable and the city has not annexed any land. Two land redevelopments projects took place in the past five years. A residential home was converted to industrial use, by the company S.M.I. Hydraulics and a residential home became a commercial recycling company. Two recent development projects within the City include additions to the Fire Hall in 2009 and the Community Center in 2006-2007. Porter has a small strip of land designated as 100-year floodplain surrounding the creek (North Branch of Yellow Medicine River) that runs through the town in the southeastern corner. The dominant land use surrounding the creek is agriculture and no future development is slated for the floodplain area. The City of Porter's general land use category breakdown is provided in Table 4.22 below.

Table 4.22 City of Porter – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	109	69.43%
Commercial	21	13.38%
Agricultural	12	7.64%
Government	20	12.66%
Religious	2	1.27%
Industrial	4	2.55%
Total	157	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

The City of Porter has designated three areas designated for future growth, all within existing city limits. Industrial growth is slated to occur east of current residential housing. This land is in two pieces that would be connected to the city road grid with an additional road heading east. The City intends to support residential growth west of current residential housing, south of County State Aid Highway (CSAH) 68 and currently owns this portion of land. There is an easement in place for a future residential street. None of this future development is located in hazard areas defined later in this section, aside from a potential tornado event.

Figure 4.22 Porter Land Use

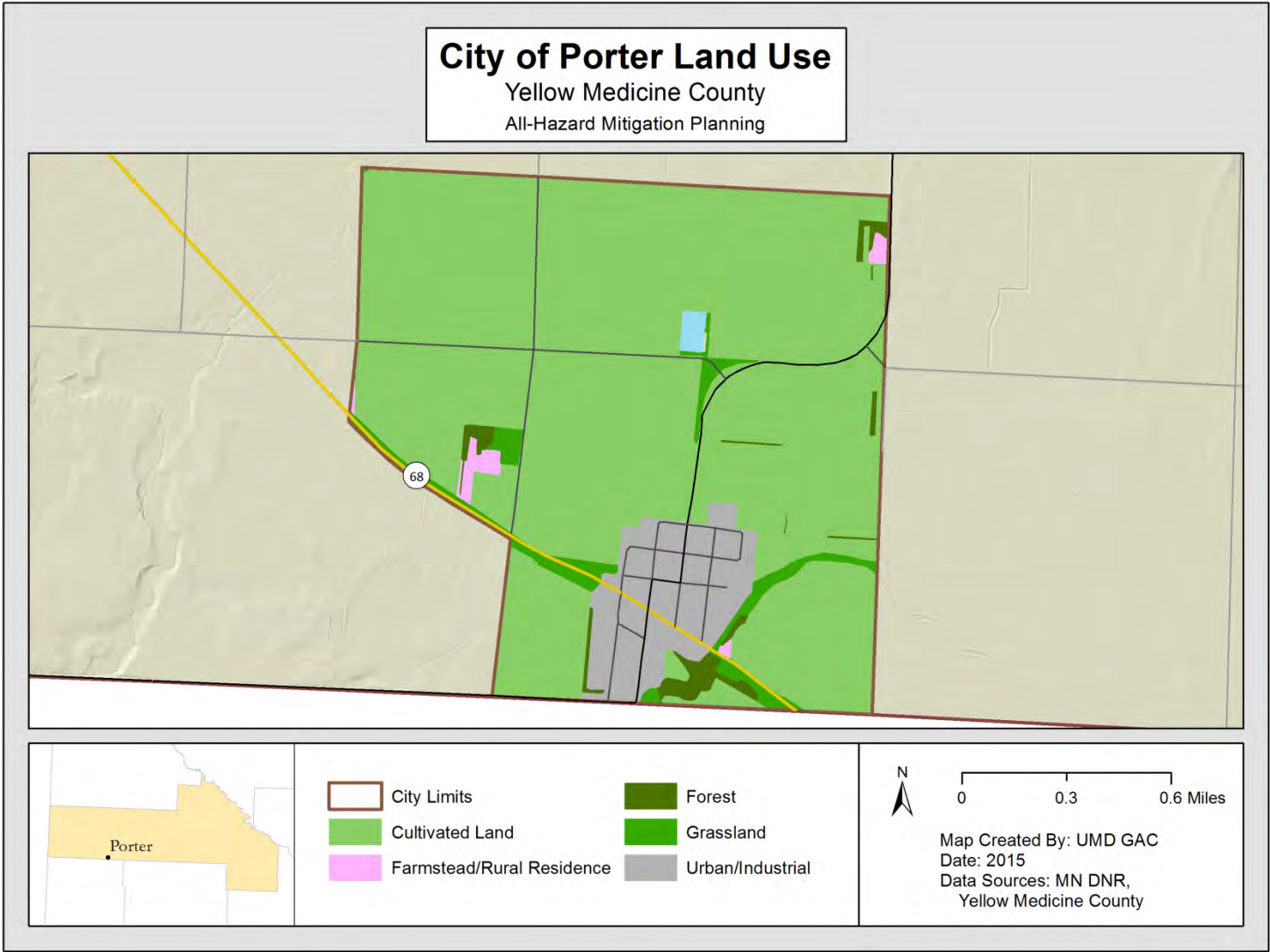


Figure 4.23 Porter Community Assets/Critical Facilities

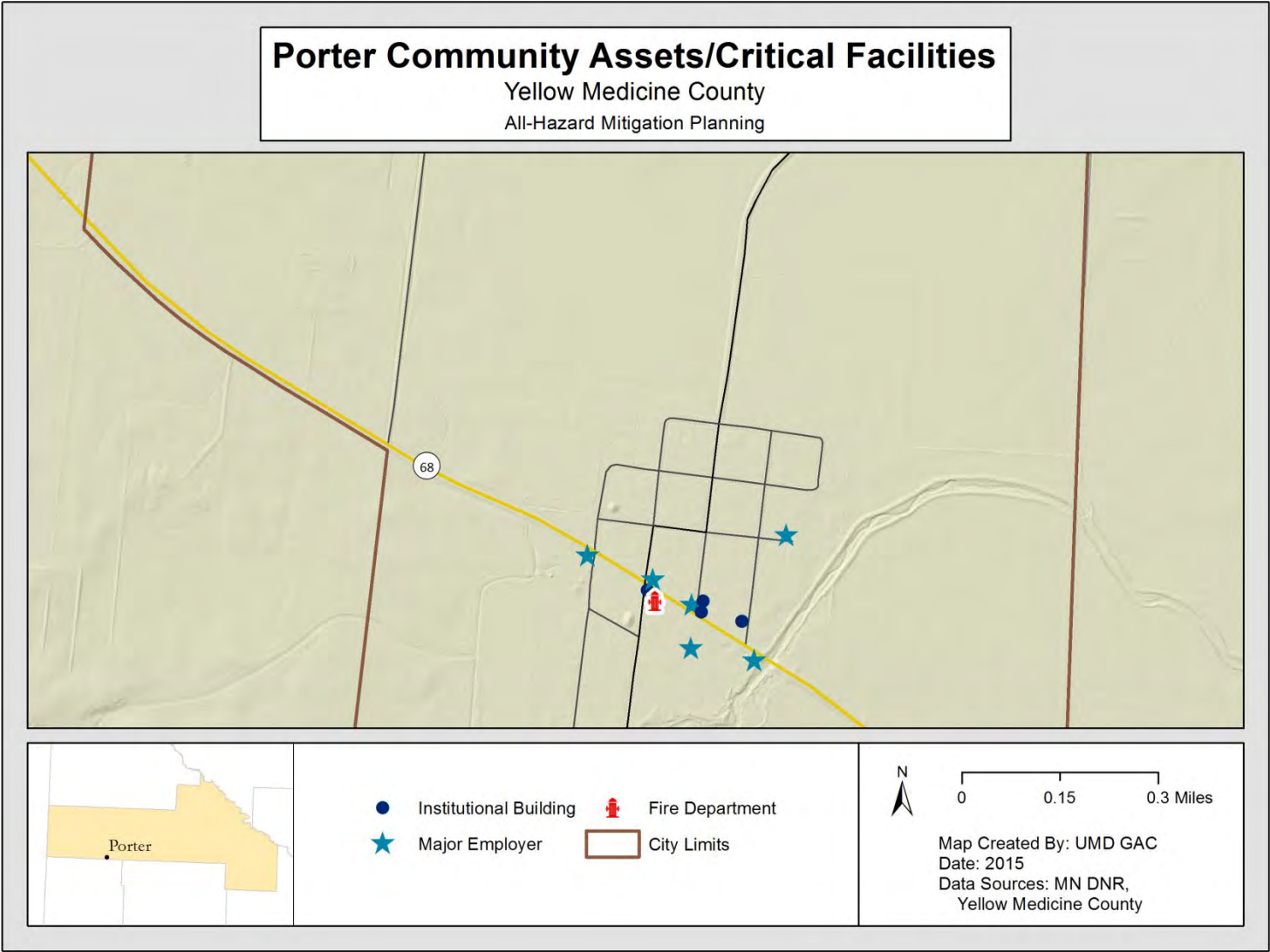
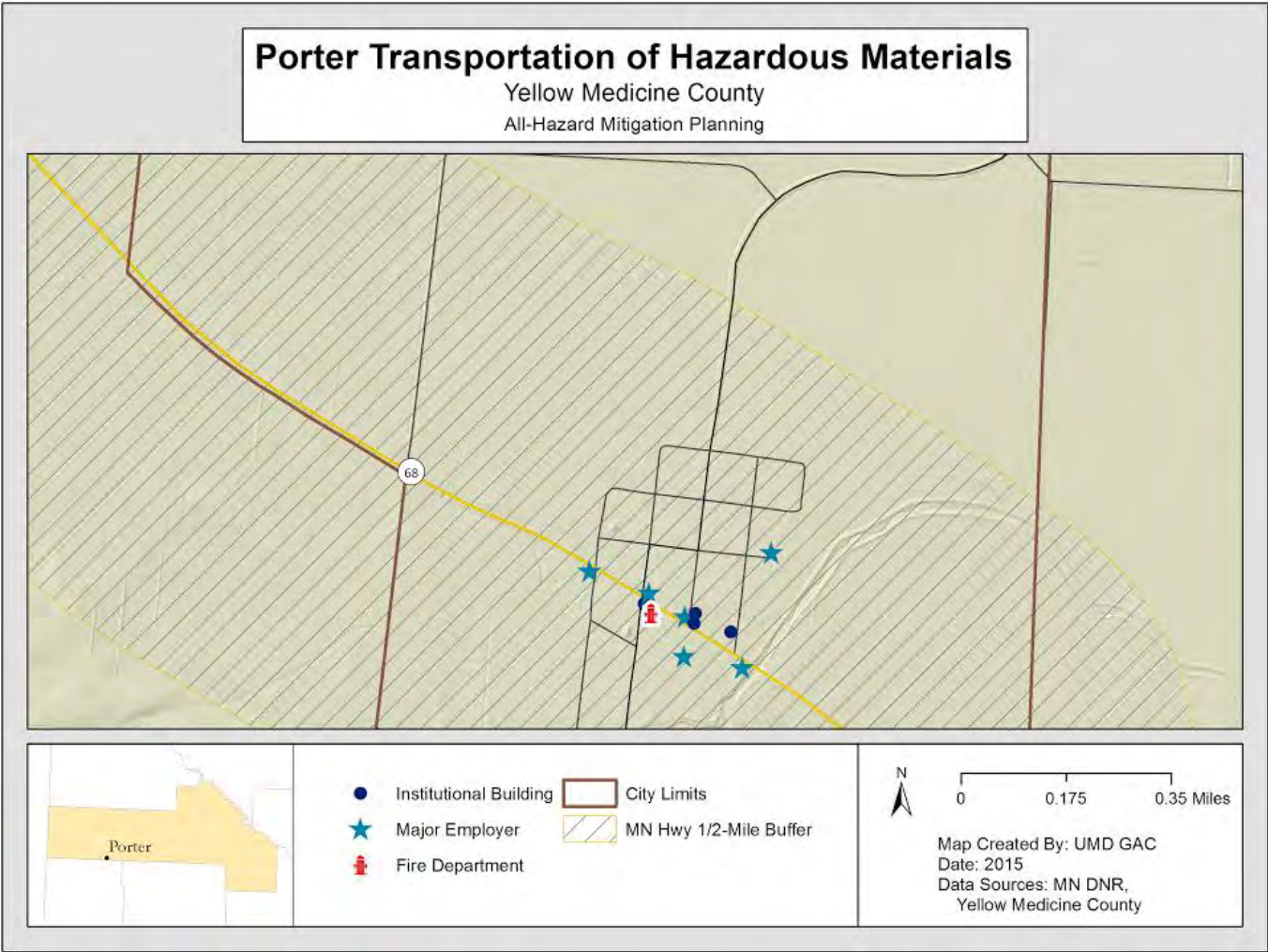


Figure 4.24 Porter Transportation of Hazardous Materials



City of St. Leo, Minnesota

Existing Development Trends

According to the Minnesota State Demographic Center, the population of the City of St. Leo was estimated to be 97 with 49 households in 2013. The population trends noted in Chapter 2: Community Profile for the City of St. Leo illustrated a general decrease in population and number of households from 1970 to 2010, with the greatest population loss occurring from 1980 to 1990 (24%). Throughout the past decade, St. Leo's economy has remained stable and the city has not annexed any land, nor have any development/redevelopment projects occurred. The City of St. Leo's general land use category breakdown is provided in Table 4.23 below.

Table 4.23 City of St. Leo – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	54	71.05%
Commercial	6	7.89%
Agricultural	6	7.89%
Government	9	11.84%
Religious	1	1.32%
Total	76	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

The City of St. Leo does not have a specific future growth plan. Rather, the community is more focused on citizen and business retention. Generally, the City would like to increase population and housing units, as well as create new business opportunities.

Figure 4.25 St. Leo Land Use

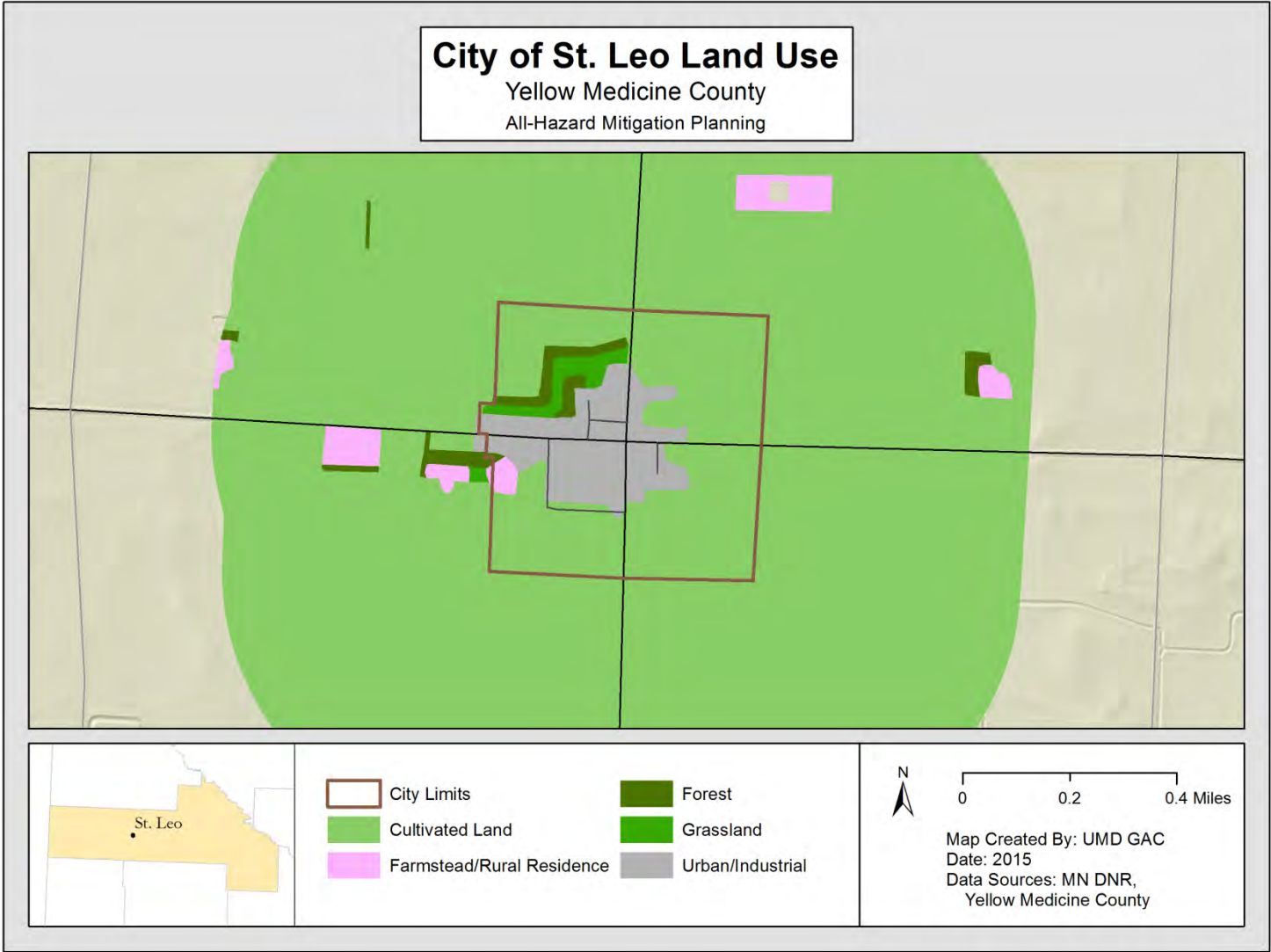


Figure 4.26 St. Leo Community Assets/Critical Facilities

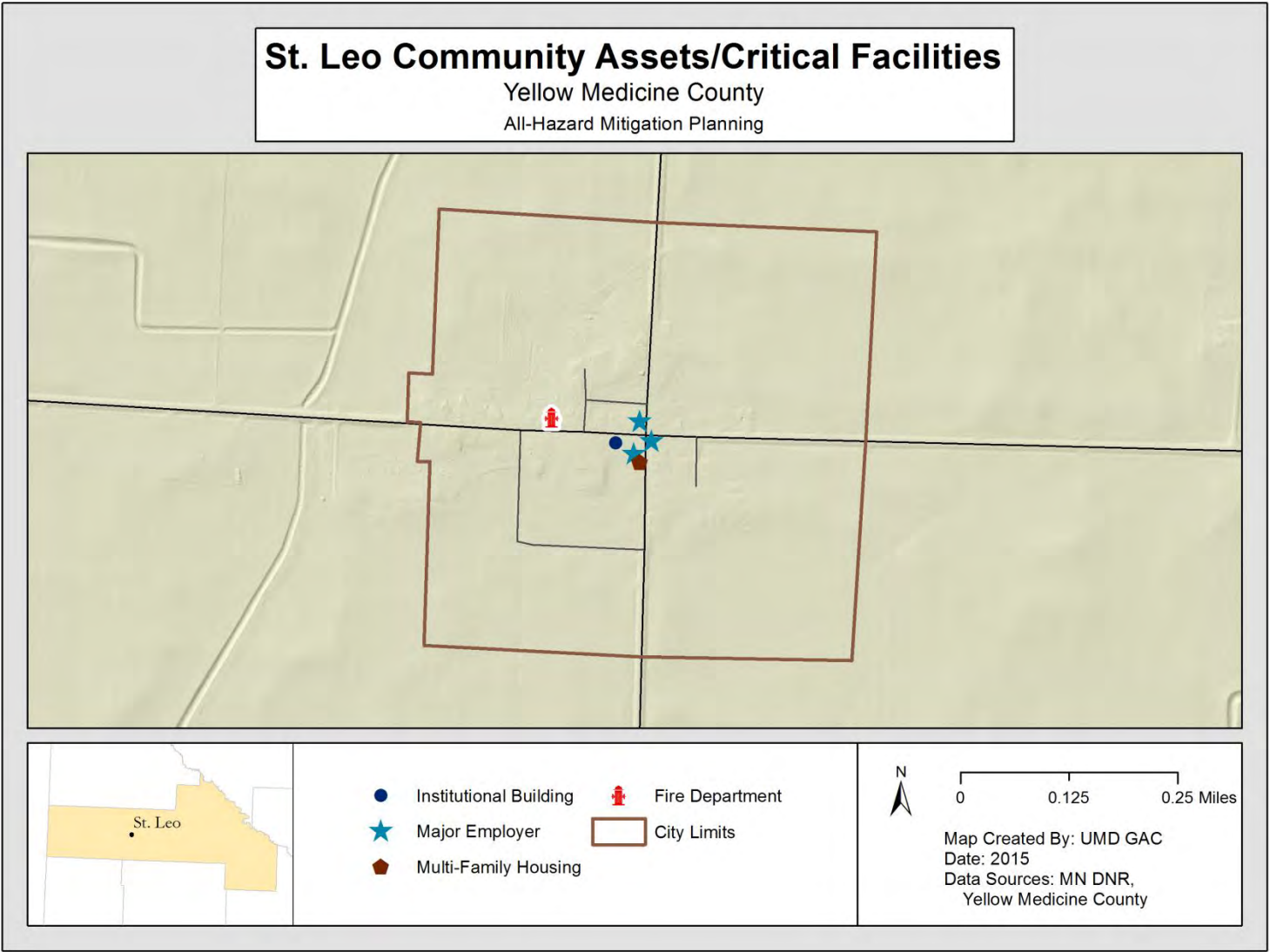
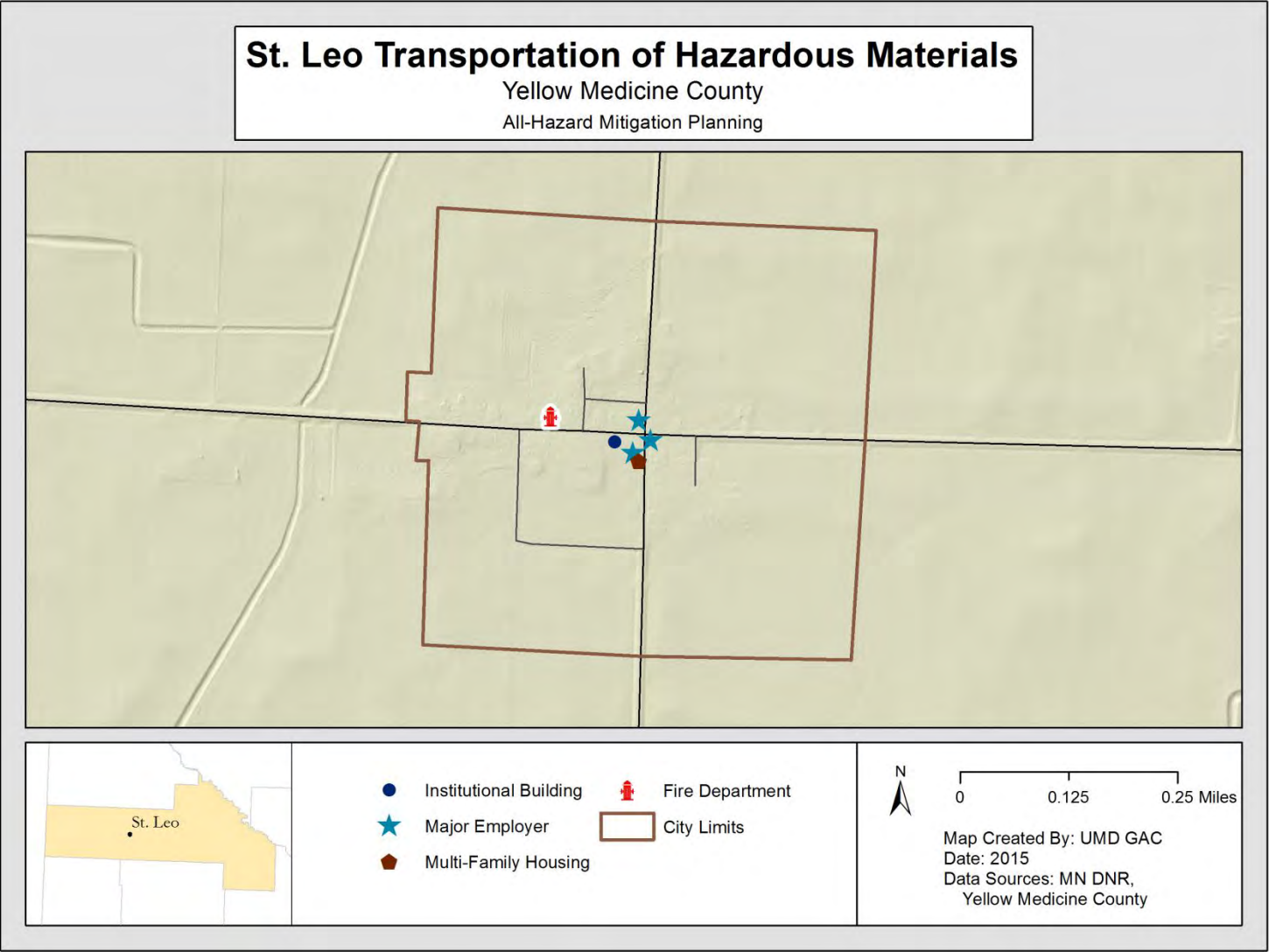


Figure 4.27 St. Leo Transportation of Hazardous Materials



City of Wood Lake, Minnesota

Existing Development Trends

According to the Minnesota State Demographic Center, the population of City of Wood Lake was estimated to be 426 in 2013 with 176 households. The population trends noted in Chapter 2: Community Profile for the City of Wood Lake illustrated a “peaks and valley” population change from 1970 to 2008. From 1980 to 1990, the population decreased by 3%, followed by an increase of 7% in the following decade, with a final decrease of about 13% from 2000 to the estimated 2010 population count. Throughout the past decade, Wood Lake’s economy has remained stable and the City has not annexed any land, nor have any development or redevelopment projects occurred. The City of Wood Lake’s general land use category breakdown is provided in Table 4.24.

Table 4.24 City of Wood Lake – Land Use Category Allotments

Land Use Type	Parcel Count	Percent of Area
Residential	196	69.50%
Commercial	34	12.06%
Agricultural	16	5.67%
Government	25	8.87%
Religious	5	1.77%
Industrial	6	2.13%
Total	282	100.00%

Source: Yellow Medicine County Assessor, 2009

Potential for Future Growth and Development

The City of Wood Lake has two specified areas for future growth and development projects. The city has planned a commercial and industrial growth area north of the city and intends to replace an empty school within the south-central portion of the City with a residential housing development and commercial development along Highway 274.

Figure 4.28 Wood Lake Land Use

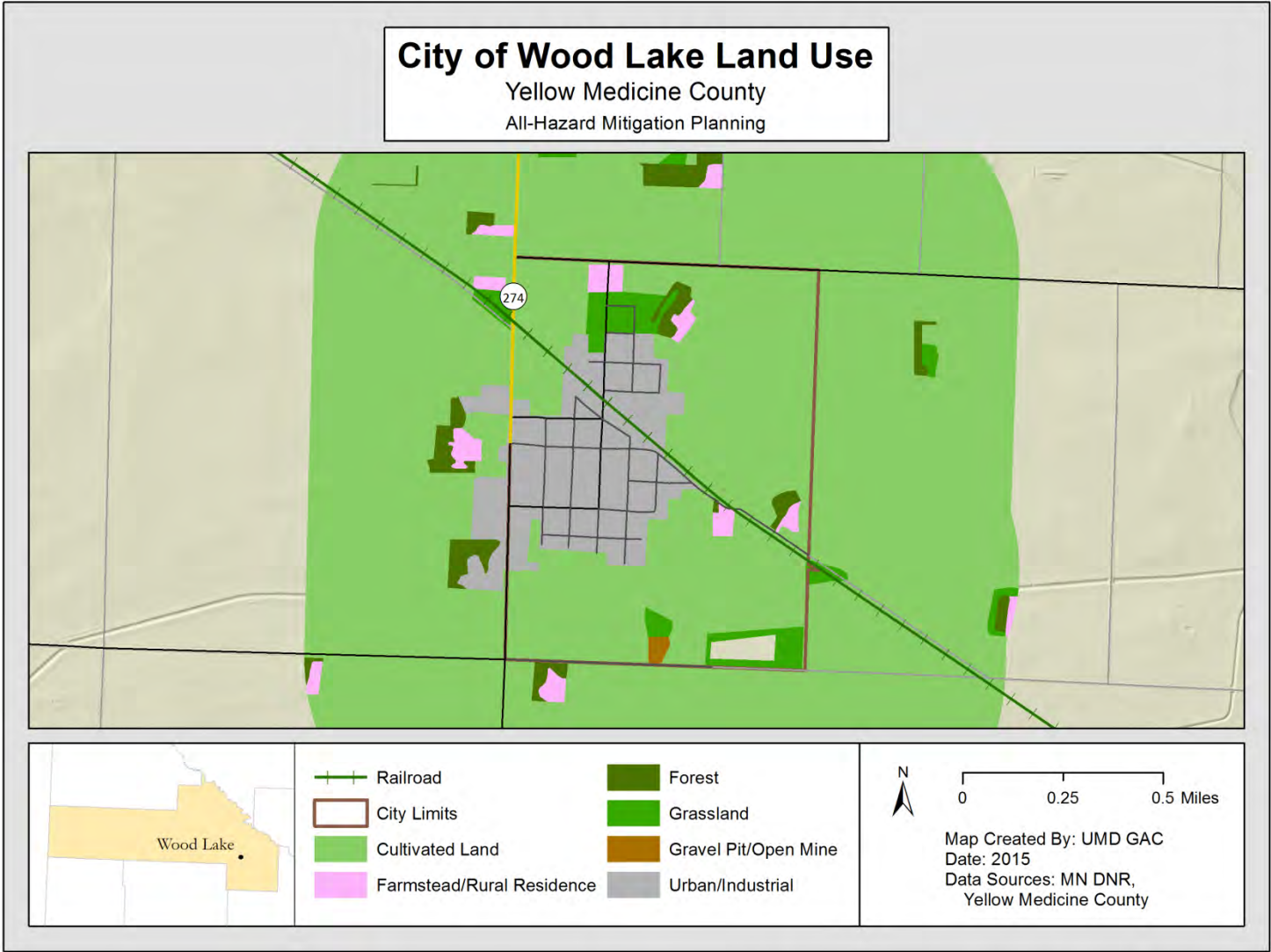


Figure 4.29 Wood Lake Community Assets/Critical Facilities

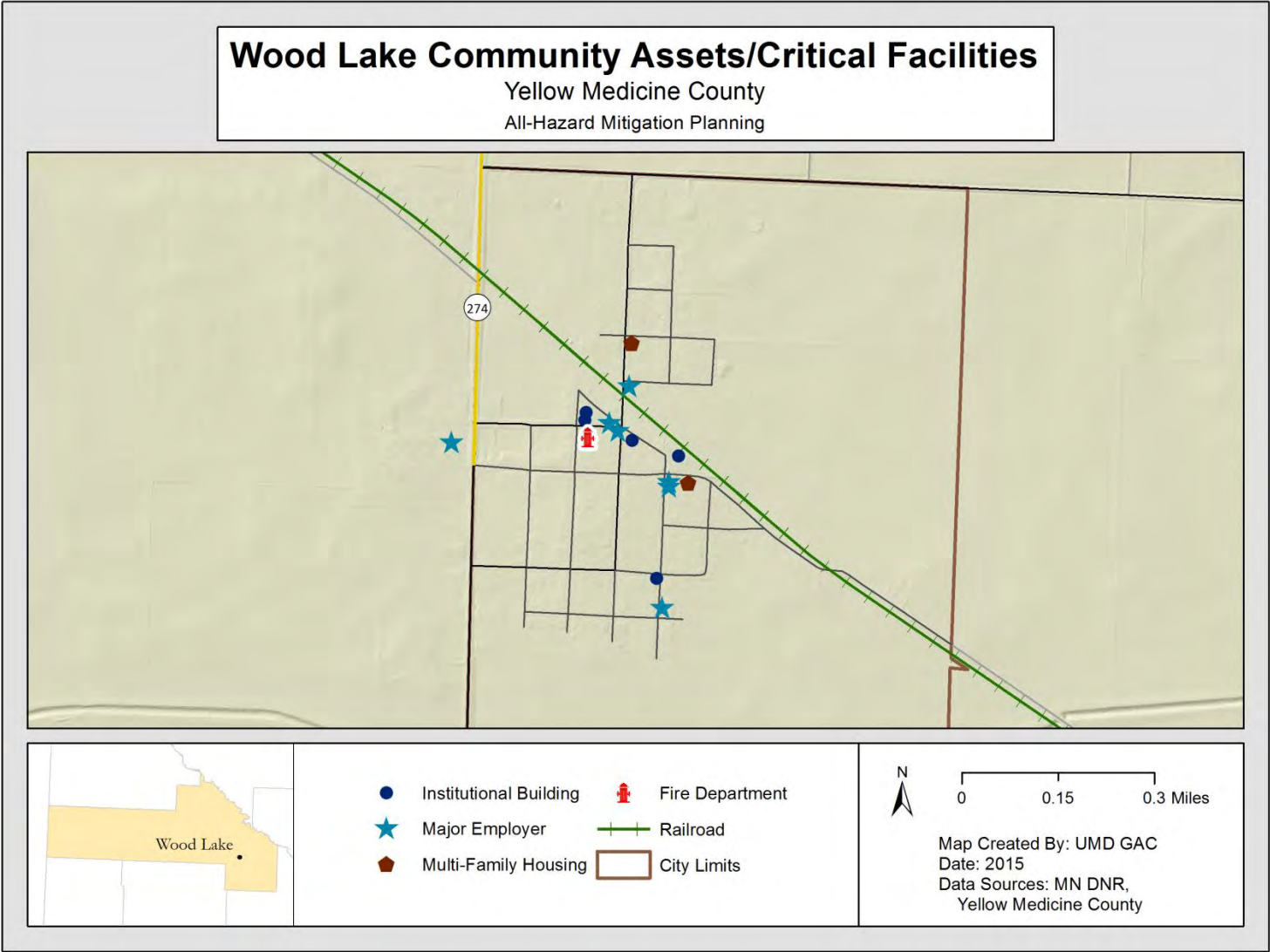
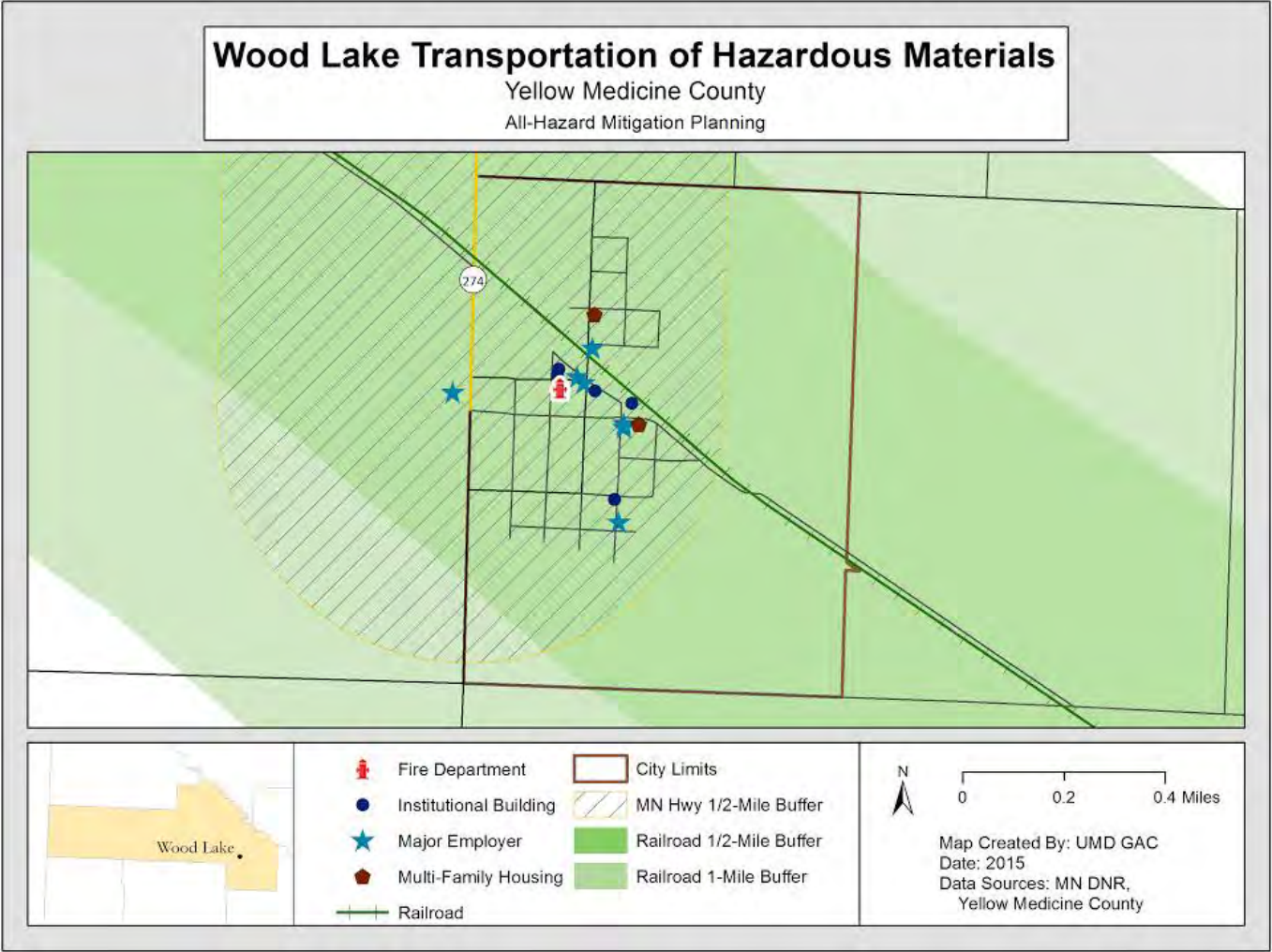


Figure 4.30 Wood Lake Transportation of Hazardous Materials



CHAPTER 5: GOALS, OBJECTIVES, AND STRATEGIES FOR NATURAL HAZARDS

OVERVIEW

The following tables outline the goals, objectives, and mitigation strategies for natural hazards important to Yellow Medicine County. The goals are used as a framework for the objectives and mitigation strategies, which in turn, provide specific information on how mitigation decisions should be made. The goals, objectives, and strategies are based on the issues identified by the Local Task Force and the risk assessment in this plan. The chapter is divided into three sections; completed strategies by Yellow Medicine County and cities, current goals, objectives, and strategies for Yellow Medicine County and cities, and the prioritization of strategies.

DEFINITIONS

Goals are general statements. **Objectives** are action statements and start with an action verb. **Strategies** support the action of the objective.

The **Time Frame** was determined by the task force and the County Emergency Manager as an estimated timeline in which to complete the strategy.

The **Time Frame – Recurring** is a strategy type that does not have a specific length of time. Once the strategy has been completed, the responsible entity will re-start the strategy.

Responsible Entity is the entity in charge of initiating and completing the strategy identified. This was determined by the task force and County Emergency Manager as the most likely entity to complete the strategy.

The **Estimated Cost** was an educated guess of the cost of each strategy. Some strategies would not cost extra and were denoted “—”. Some costs were not known and denoted as “unknown”.

The **Funding Partner** is a potential partner for the county/city to obtain funding from in order to complete a strategy.

GENERAL MITIGATION VISION

“The county will strive to work with surrounding communities and local emergency responders to create and implement a proactive and results-oriented all-hazard mitigation plan that will make the county and region a safer and more sustainable place to live by protecting and enhancing the resources of the county as they relate to hazards that may have an impact in the future.”

DEVELOPMENT OF STRATEGIES

To determine strategies for each hazard identified in the risk assessment (Chapter 4) small group problem-solving techniques were used at the third task force meeting on October 30th, 2014. Once the hazards most likely to affect Yellow Medicine County were identified and prioritized, the task force assembled to review these hazards and their rankings and identify strategies to address mitigation for each hazard. Past hazard activities in the county influenced strategy development and strategy ranking (i.e. 1997 and 2001 flooding). In many cases, as the hazards were identified for the inventory, strategies were also discussed, providing a good starting point for the conversation.

The following outlines the plan's strategy development process. 1) Working toward group consensus, each hazard was reviewed individually. 2) Participants offered suggestions and input which stimulated a lively discussion as part of the planning process. All suggestions were considered and recorded by the facilitator. 3) A limited amount of time was set on each hazard by the facilitator to move the group forward. 4) Debate followed before the group was asked to decide if it should be part of the plan – group consensus was needed. 5) The group noted they could not be totally inclusive – some strategies may not even be considered and others may not be feasible.

General Criteria

- | | |
|--------------------------|------------------------------------|
| 1. History | 5. Effectiveness |
| 2. Successful Strategies | 6. Building on what already exists |
| 3. Need | 7. Legal Authority |
| 4. Risks | 8. Environmental Impact |

Cost/Benefit Criteria

- | | |
|------------------------|---|
| 1. Costs/Efficiencies | 4. Overall Impact |
| 2. Economic Impact | 5. Resources Needed (Social & Fiscal) |
| 3. Budget Requirements | 6. Benefits Provided by Project (Social & Fiscal) |

Identifying costs that would be attached to each strategy was the most difficult part of the process. Due to limited time and resources to develop the plan it wasn't feasible to spend a lot of time on estimating the costs. It is critical for the Board to constantly be evaluating the costs as part of implementation and maintenance for the All-Hazard Mitigation Plan. Strategies that dealt with rural areas seemed harder to include in the plan – more costly, harder to regulate, and would need population buy-in. Many strategies are costly, labor intensive, time consuming and it is difficult to identify the lead for the strategy. It was determined that the Emergency Manager will perform a cost-benefit review for all potential future project applications. Participants in the planning process agreed that to implement an ordinance or regulation was not the difficult part of certain strategies – would it be possible and feasible to follow-through? Participants started with strategies that were manageable to see notable progress – “baby steps”. It was reasonable to include strategies that have been started, but not yet completed.

In addition to creating new mitigation strategies for Yellow Medicine County, the Local Task Force analyzed strategies found in the 2010 All-Hazard Mitigation Plan. The process for strategy analysis included two steps: Step 1) Discuss a strategy and determine its “status”, Step 2) Determine why the strategy has that status. Four different “Statuses” were available to assign to a strategy: 1) Completed, 2) Still Feasible 3) Recurring - does not have a specific time length and once the strategy is completed the responsible entity will restart the strategy, and 4) No longer relevant. Once a strategy was assigned a status by the Local Task Force through group consensus, the Local Task Force had to determine **why** it received that status designation. For example, a Flood Strategy that received “not completed – strategy is still feasible” may have not been completed due to fund shortage; however, a jurisdiction may see that flood project as still important to complete in the future.

Following the third Local Task Force meeting, the task force participated in an online survey to prioritize mitigation strategies. The results of this survey (located in Appendix 11) were compared with the prioritized hazard list and the top strategies were pulled out for the top three natural hazards (Violent Storms and Extreme Temperatures, Flooding, and Wildfire). The prioritized strategy list was reviewed, discussed, and verified at the fourth Task Force meeting on March 26th, 2015.

HMPG FUNDED STRATEGIES: YELLOW MEDICINE COUNTY AND CITIES

Table 5.1 YMC & Cities Hazard Mitigation Grant Program Funded Strategies (FEMA-Related)

SUBGRANTEE	PROJECT	FEDERAL SHARE	DR-PROJECT NUMBER	CITY/LOCATION	DATE STARTED
Lyon Lincoln Electric	Power Line Conversion	\$335,625	DR-1151.02	Yellow Medicine County	October 1997
Yellow Medicine County	Acquisition of 9 Properties	\$178,905	DR-1175.10	Echo - 1 property, Granite Falls – 8 properties	October- November 1997
Yellow Medicine County Soil & Water Conservation District	Living Snow Fence	\$47,004	DR-1175.34	Yellow Medicine County	February 1999
Yellow Medicine County	Acquisition of 3 Properties	\$95,026	DR-1370.02	Granite Falls	July 2001
Lyon Lincoln Electric	Power Line Conversion	\$434,400	DR-1569.08	Yellow Medicine County	November 2006
Lyon Lincoln Electric	Power Line Conversion	\$311,877	DR-1622.04	Yellow Medicine County	July 2007

Source: MN HSEM Mitigation Database: Appendix L, 2015

COMPLETED STRATEGIES

Table 5.2 YMC & Cities Completed Strategies in Past 10 Years for Natural Hazards

Hazard	Strategies	Responsible Entity
Violent Storms & Extreme Temperatures	The County Emergency Manager, emergency personnel (fire, police and ambulance), and representatives from nursing homes and hospitals have met annually to assess storm safety procedures including safe rooms.	County
Violent Storms & Extreme Temperatures	Safe Room built at Del Clarke Lake.	County and Canby
Violent Storms & Extreme Temperatures	Public Education on Safe Rooms.	All Cities
Violent Storms & Extreme Temperatures	Assess adequacy of the county civil defense siren system. Look for funding to add sirens to cities without complete siren coverage, provide backup power to all sirens and replace malfunctioning sirens.	County and All Cities
Violent Storms & Extreme Temperatures	Improve links to National Weather Service to obtain current storm warning information.	County
Violent Storms & Extreme Temperatures	Switch from UHF to VHF and include new towers and radios.	County
Violent Storms & Extreme Temperatures	Purchase new digital radios and mobile computers for police department.	Clarkfield
Floods	Complete the acquisition and relocation of three homes on Minnesota Avenue. Complete plan to keep historical building intact.	Granite Falls
Floods	Complete acquisition and relocation of Main Street businesses. The buildings north of Ladner's should be flood proofed and renovated to have one floor leased. Buildings south of Ladner's should be removed completely.	Granite Falls
Floods	Relocate City Hall and demolish existing City Hall.	Granite Falls
Floods	Consider flood proofing the Yellow Medicine County Museum and building a levee in the floodplain.	Granite Falls
Floods	Lac qui Parle-Yellow bank Watershed District completed the Lazarus Dam Project, increasing the height and length of a levee and created a "dry dam" to hold waters of a 100-year flood event.	Watershed District and DNR
Floods	Relocate the Water Treatment Plant	Granite Falls
Floods	Acquire land for right of way levee footprint and consider buyout of properties.	Granite Falls
Floods	Install a permanent pumping station at the intersection of Prentice Street and Main Street as well as the intersection of 12 th Avenue and 7 th Street.	Granite Falls
Floods	Modify and raise the Dike Road Levee.	Granite Falls

Floods	Install a fixed weir section in the temporary levee to control water discharge.	Granite Falls
Floods	Raise the Reach 1 Levee.	Granite Falls
Floods	Relocate the Water Treatment Plant in Granite Falls out of the Floodplain.	Granite Falls
Floods	Upgrade and protect the Dike Road levee.	Granite Falls
Drought	Continually monitor water meters.	Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Drought	Actions by County Board and City Council to adopt a complementing wellhead protection ordinance.	Canby
Drought	Ensure water consumption information is available during drought times.	Granite Falls and Canby
Wildfire	Create a mutual aid agreement between DNR and local fire departments to organize response to large wildfires.	West Central Firefighters Association, Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Wildfire	Encourage DNR to give training locally.	Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Wildfire	Do an inventory of wildfire equipment available and look for grants for additional and updated equipment when necessary.	Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Wildfire	Remove debris and dead vegetation around camping areas on an annual basis.	Yellow Medicine County, Canby

GOALS, OBJECTIVES, AND STRATEGIES

Violent Storms and Extreme Temperatures

Goal 1: Have safe and accessible safe rooms from violent storms.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Encourage homes without basements to have a safe room where household residents may go in case of violent storms.	A. Educate public on safe rooms.	Recurring	All Cities and County	\$500	--
2. Ensure that all hospitals, schools and nursing home facilities have a severe storm plan in place to protect patients and students.	A. Each city should meet annually with the County Emergency Manager, emergency personnel (fire, police and ambulance), and representatives from nursing homes, schools and hospitals to assess storm safety procedures including safe rooms.	Recurring	All Cities and County	N/A	County
3. Educate residents of safe rooms in community.	A. Identify and/or map community safe rooms that could be used by manufactured home parks and other residents that do not have safe room on their property. Provide a handout to all residents with a pamphlet outlining emergency information.	1-2 years	Cities of Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Porter, and St. Leo	\$500 per city	FEMA
4. Continue to address safe room needs in the county.	A. Educate the public with a presence at county fairs, flyers and newspaper articles including the "sheltering in place" component.	Recurring	County Emergency Manager	\$1,000	--
	B. Investigate feasibility of providing safe room at city, county, and state parks and public golf courses. Identify a safe room for the campgrounds in cities and the greater county.	2-15 years	All Cities and County	\$150,000 for county	FEMA
	C. Build safe rooms as needed.	2-15 years	All Cities	\$150,000/ shelter	FEMA
	D. Build safe rooms at city, county, and state campgrounds and parks, and other locations of unprotected populations (i.e. schools, manufactured home parks, all recreational parks, apartment buildings, nursing homes, medical facilities, etc.) to protect users from violent storms.	2-10 years	All Cities and County	\$150,000/ shelter	FEMA

Violent Storms and Extreme Temperatures

Goal 2: Improve severe storm warning system for all county residents.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Assess adequacy of existing civil defense sirens.	A. Inventory and assess adequacy of the county civil defense siren system. Add sirens to cities as well as city, county, and state parks and campgrounds without complete siren coverage, provide backup power to all sirens, and replace malfunctioning sirens.	2-5 years	County Emergency Manager, Cities of Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake	\$63,000 for county \$17,000 per siren, varies by city	NOAA
2. Ensure that all communities and rural areas of the county have immediate access to severe weather warnings and communications.	A. Improve links to National Weather Service to obtain current storm warning information.	Recurring	County	--	--
	B. Make weather radios available to rural residents. *New Strategy	Recurring	County	\$25 each	--
3. Assess Yellow Medicine County's current warning system: how the county is notified; who and how people and organizations within the county are notified.	A. Get additional funding for the Incident Command System (ICS) to work on regional projects. Research and secure federal funding to upgrade county warning system.	3-5 years/ Recurring	County	\$50,000	NWS
	B. Research and obtain funding for implementing cell phone notifications for severe weather events and other hazardous events.	2-5 years	County Emergency Manager, County	Unknown	--

Violent Storms and Extreme Temperatures

Goal 3: Protect people and infrastructure from the impacts of severe weather.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Encourage that all new local electrical distribution lines be placed underground when applicable.	A. Work with utility companies to assess the safest placement of utility lines.	Recurring	County, All Cities, MN Valley Cooperative, Xcel	--	FEMA
	B. Underground burial of power lines.	Recurring	County, All Cities, MN Valley Cooperative, Xcel	--	
2. Keep tree plantings away from power lines.	A. Educate public to keep tree plantings away from power lines.	Recurring	County SWCD	\$1,000	--
	B. Modify county official controls to control tree growth near power lines and encourage cities to do the same.	Recurring	County SWCD, Granite Falls	\$1,000	--

Violent Storms and Extreme Temperatures

Goal 4: Provide emergency response to protect people in the event of a severe weather disaster.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Establish an emergency operations center that is equipped with necessary tools and provide a backup location to this center. These locations should also have a backup power source.	A. Install wiring, transfer switch, and generators to all communities in the county that serve as emergency operations centers and to community buildings that act as safe rooms for residents.	2 years	Cities of Clarkfield, Canby, Echo, Hanley Falls, Hazel Run, Porter, St. Leo, and Wood Lake	\$2,000 - \$20,000	FEMA
2. Ensure that County and City Emergency Operations Plans are kept up-to-date.	A. Each community should continue to meet annually with the County Emergency Manager and emergency personnel (Fire, Police, Ambulance – when applicable) to assess the County Emergency Operations Plan.	Recurring	County Emergency Manager, All Cities	--	--

Flood

Goal 1: Eliminate nonconforming structures in the identified 100-year floodplain.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Eliminate existing nonconforming private and public structures in identified 100-year floodplains in Granite Falls.	A. Move the Granite Falls Fire Hall to a location outside of the floodplain.	5 years	City of Granite Falls, FEMA, Fire Association	\$1 million	FEMA/DNR
	C. Relocate the 2 farmsteads near Dike Road in Stony Run Township.	5 years	Stony Run Township, City of Granite Falls	Unknown	FEMA/DNR
2. Address flooding issues of the Yellow Medicine County Museum in Granite Falls.	A. Work with the county and DNR to find a solution to prevent flood damages.	Recurring	County, City of Granite Falls, Yellow Medicine Historical Society, DNR	--	FEMA/DNR
	B. Relocate the YMC Museum in Granite Falls to a site outside the 100-year floodplain.	Recurring	County, City of Granite Falls, Yellow Medicine Historical Society, DNR	--	FEMA/DNR
3. Encourage cities to adopt Floodplain Ordinances if they have 100-year floodplains.	A. Draft and adopt a floodplain ordinance.	6 months	City of Porter	--	--

Flood

Goal 2: Improve the safety and security of Granite Falls and other flood prone areas.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Protect the Sanitary Sewer Treatment Plant in Granite Falls from future flooding.	A. Relocate existing sanitary sewer lift station.	2 years	City of Granite Falls	\$325,000	FEMA/DNR
2. Prevent sanitary sewer line from becoming inundated with spring flooding.	Replace approximately 1,500 lineal feet of sanitary sewer on the west side of the Minnesota River, south of the river crossing.	5 years	City of Granite Falls	\$401,000	FEMA
3. Address flooding issues as a region.	A. Work with state agencies, local governments, and emergency managers to address flooding issues as a region.	Recurring	County Emergency Manager, Cities of Canby, Clarkfield, Granite Falls, and Porter	\$10,000	FEMA
	B. Complete a City-wide storm water Project with 6 additional lines and refurbishing an existing storm water line.	2 years	City of Canby	Unknown	FEMA
	C. Purchase two 1,200 gallon/minute diesel portable pumps to handle rain/snow melt.	3-5 years	City of Granite Falls	Unknown	FEMA
4. Establish a plan of action to address flood emergencies.	A. Identify necessary resources for flood emergencies in the region and contract for assistance.	Recurring	County Emergency Manager, Cities of Canby, Clarkfield, Granite Falls, and Porter	--	--
	B. Work regionally to improve the flood forecast system.	Recurring	County Emergency Manager	\$30,000	HSEM
5. Evaluate flood risks for the floodplains of Canby Creek and the confluence of Spring Creek and the Yellow Medicine River.	A. Acquire funding to do research and assessment as needed.	Recurring	Watershed Districts, DNR, SWCD	Unknown	FEMA/DNR
6. Educate the public on "sanitation cutting" that is allowed on RIM land which allows timber to be removed on land prone to flooding.	A. Work with the SWCD to educate the public on this program.	Recurring	County, Watershed Districts	--	--

Flood

Goal 3: Protect the structures that are repeatedly flooded.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Flood proof buildings that are repeatedly flooded.	A. Flood proof the Hydro Plant in Granite Falls.	3-5 years	City of Granite Falls	\$200,000	FEMA/DNR
	B. Flood proof the apartment building on Minnesota Avenue in Granite Falls.	3-5 years	City of Granite Falls	\$50,000	FEMA/DNR

Goal 4: Minimize infrastructure damage from flooding.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Reduce inflow and infiltration into municipal sewer systems.	A. Monitor to determine where and why inflow and infiltration is occurring.	Recurring	Yellow Medicine County Watersheds and Zoning, All Cities.	--	Unknown

Goal 5: Ensure continued compliance with NFIP standards for participating communities.					
See next section “ NFIP Compliance ” starting on page 19 for discussion.					

Erosion

Goal 1: Minimize property damage and reduce economic impacts of erosion.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
Limit the potential loss of property and economic impact from river and ravine erosion, landslides, and slope failure. *New Goal , Objectives, and Strategies	A. Support demolition and/or relocation of dwellings and infrastructure to prevent loss of property due to erosion, landslides, or slope failure	Recurring	County Emergency Manager	Unknown	FEMA, MN DNR
Prevent possibility of damage from river and ravine erosion, landslides, and slope failure.	A. Review, update, and enforce zoning ordinances that prohibit building in areas that are susceptible to water erosion, landslides, and slope failure.	1-2 years	County, All Cities	--	--
Educate the public on possible effects of erosion, landslides, and slope failure.	A. Increase public awareness and knowledge on erosion landslides, and slope failure, targeting individuals and businesses located in high risk areas.	Recurring	County Emergency Manager, County Zoning	--	--

Drought

Goal 1: Adopt a wellhead protection ordinance as proposed in the county Comprehensive Water Plan.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Coordinate with and encourage cities within the county to adopt complementing wellhead protection ordinances/plans.	A. Actions by County Board and City Councils.	2-10 years	County, Cities of Clarkfield, Hanley Falls, Hazel Run, and Wood Lake	Staff Time	--
	B. Implement wellhead protection ordinances/plans.	2-10 years	County, Clarkfield, Hanley Falls, Hazel Run, Wood Lake	Staff Time	

Goal 2: Monitor the county's ground water supplies and demands.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Encourage use of water meters to monitor water consumption.	A. Most communities have water meters. Ensure water consumption information is available during drought times.	Recurring	Cities of Clarkfield, Echo, Hanley Falls, Hazel Run, Porter, St. Leo, and Wood Lake	--	--
2. Establish a comprehensive and ongoing water monitoring program.	A. Drill monitoring wells into each of the county's major aquifers at the appropriate locations and establish an ongoing program to monitor aquifer levels and water quality.	Recurring	DNR, SWCD, County, Lincoln Pipestone Rural	--	--

Wildfire

Goal 1: Prevent Wildfires					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Minimize the amount of fuel (dry/dead grasses) in areas prone to fire damage.	A. Work with the Minnesota DNR to include prescribed burning on all county lands and parks. Work with FSA to educate landowners about cost share funding available for controlled burns on CRP and CREP lands. Provide regulations in conservation plantings that consider controlled burns in the future.	Recurring	County SWCD, FSA, DNR	--	--
2. Minimize wildfire risks within the county.	A. Work with/offer input as the DNR creates a wildfire susceptibility model to determine areas which are more prone to wildfires.	Recurring	DNR (lead agency) County	--	DNR
	B. Remove debris and dead vegetation around camping areas on an annual basis. Thin the tree canopy surrounding camping areas to minimize chances of wildfires from spreading.	Recurring	County, Canby, Granite Falls, Campground Managers	--	--
3. Make sure the railroad keeps grass mowed along the tracks.	A. Contact railroads when railroads are not kept clean.	Recurring	Cities of Clarkfield, Granite Falls, Hanley Falls, Hazel Run, Wood Lake	--	--

Wildfire

Goal 2: Protect the safety of residents.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Provide education to the public about wildfire prevention.	A. Work with neighborhood associations and provide materials to the public on property maintenance.	Recurring	County, All City Fire Departments	\$5,000	--

Goal 3: Minimize Structure loss from wildfire.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Promote training programs between the DNR and local firefighters.	A. Encourage DNR to give training locally. Look for funds for training if necessary.	Recurring	DNR, All City Fire Departments	--	DNR
2. Increase access to equipment suitable to fighting wildfires.	A. Inventory wildfire equipment available in county. Look for grants for additional and updated equipment as needed (grass rigs, ATVs, etc.).	Recurring	All City Fire Departments	Varies for each City FD	FEMA/DNR
	B. Look at access roads and driveways to areas prone to wildfire to provide for a wider variety of fire equipment.	Recurring	All City Fire Departments	\$30,000	--

Dam Failure

Goal 1: Prevent structure from cracking or breaking.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Ensure dams are maintained and function properly.	A. Coordinate regular dam inspections with the DNR and US Army Corps of Engineers (ACOE).	Recurring	City of Granite Falls, Lac qui Parle Watershed District, ACOE, DNR	--	--

Goal 2: Provide safety to residents					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Warn residents of danger if dam failure occurs.	A. Monitor water levels of the reservoir and gauge water capacity. Ensure that emergency plans for dam failures are annually updated. Encourage the ACOE and DNR work with local agencies to keep plans current.	Recurring	Canby, Granite Falls, Watershed Districts, DNR, ACOE	--	--
2. Minimize development within floodplains.	A. Offer the Community Buyout Program to residents living within a 100-year floodplain. Amend zoning regulations to prohibit future development within the 100-year floodplain.	Recurring, 1 year	County Zoning Administrator, Porter	Unknown	--

NATIONAL FLOOD INSURANCE PROGRAM (NFIP).

The National Flood Insurance Program (NFIP) is a program regulated by the Federal Emergency Management Agency (FEMA). The NFIP provides maps for local floodplain management in an effort to reduce federal expenditures due to flood events throughout the nation. The NFIP is also the primary source for flood insurance for flood-properties and those located in 100 and 500-year floodplains. The NFIP has three basic requirements: floodplain identification and mapping, floodplain management, and the purchasing of flood insurance. Floodplains are found in five cities within Yellow Medicine. Currently, four communities actively participate in the NFIP, including Canby, Clarkfield, Granite Falls, and Porter; in addition to Yellow Medicine County. Canby, Granite Falls and Yellow Medicine County all have Floodplain Management Ordinances in effect. One community, Wood Lake, has elected not to participate in the NFIP, even though floodplains have been identified in municipal limits. Wood Lake does not participate in the program as no properties are located in the identified floodplains. Yellow Medicine County attempted to work with Wood Lake to participate in the NFIP program, however the city declined. Yellow Medicine County will continue to work with Wood Lake to encourage NFIP participation. The cities Echo, Hanley Falls, Hazel Run, and St. Leo do not have Special Flood Hazard Areas. There have been no changes in NFIP participation since the initial Yellow Medicine County All-Hazard Mitigation Plan completed in 2005. Table 5.4 identifies NFIP participation, dates of initial Flood Insurance Rate Maps (FIRM), current effectiveness of map dates, and Emergency Dates if applicable.

Table 5.4 YMC & Cities NFIP Participation

Jurisdiction	NFIP Status	Initial FIRM Identified	Current Effective Map Date	Emergency Date
Canby	Participating	6/1/1983	6/1/1983	6/1/1983
Clarkfield	Participating	no data	1/1/1950	2/28/1987
Echo	No Special Flood Hazard Areas	no data	no data	no data
Granite Falls	Participating	4/1/1977	6/4/1980	4/1/1977
Hanley Falls	No Special Flood Hazard Areas	no data	no data	no data
Hazel Run	No Special Flood Hazard Areas	no data	no data	no data
Porter	Participating	no data	7/9/1976	3/20/1974
St. Leo	No Special Flood Hazard Areas	no data	no data	no data
Wood Lake	Not Participating	no data	1/17/1975	1/17/1976
Yellow Medicine County	Participating	11/15/1978	11/15/1978	11/1/1978

Source: MN DNR 2014

Table 5.5 provides FEMA's NFIP Insurance Report for Canby, Granite Falls, and Yellow Medicine County. Information attained in this report identifies total insurance premium amounts, number of existing policies, total insurance coverage, and total claims and amounts paid to each jurisdiction since 1978.

Table 5.5 FEMA NFIP Insurance Report

Jurisdiction	Total Premium	Number of Policies	Total Coverage	Total Claims Since 1978	Total Paid Since 1978
Canby	\$11,709	12	\$1,758,100	2	\$2,179
Granite Falls	\$22,603	35	\$8,784,800	129	\$1,670,796
Yellow Medicine County	\$6,984	8	\$1,407,900	28	\$412,039
TOTAL	\$41,296	55	\$11,950,800	159	\$8,085,014

Source: FEMA Policy & Claim Statistics for Flood Insurance, 2015

NFIP Continued Compliance

FEMA mandates that all communities participating in the NFIP must identify continued compliance with the program. Following are descriptions of Canby, Clarkfield, Granite Falls, Porter, and Yellow Medicine County processes for continued compliance.

Canby

The City of Canby utilizes digital FIRM maps dated November 1978, to illustrate the location of 100 and 500-year floodplain boundaries within municipal limits. In order to prevent development in the 100-year floodplain, Canby passed a Floodplain Management Ordinance in March of 1989. The process that Canby uses to monitor potential development in the floodplain is by tracking building permits. A permit is filed and the citizen fills out the required information (location of proposed building unit, intended setbacks, etc.) and the City reviews the permit application. While reviewing the application, the City determines whether or not the building site is in the 100-year floodplain and considers the type of proposed development. If the site is in the designated floodplain, the application is sent to the DNR Area Hydrologist for review and comment.

In addition to a Floodplain Management Ordinance, the City of Canby has alluded to floodplain mitigation in the Canby Dam Contingency Plan that illustrates and defines specifically which properties should be evacuated in the event of a dam failure at the Del Clark Dam. Further, the Canby Comprehensive Plan of 2006 identifies the 100 and 500-year floodplains and made a statement that any proposed development that is located below the Ordinary Water Level requires a permit from the MN DNR, illustrating that floodplain development in the City should be avoided. Below are five strategies that the City of Canby intends to complete as methods to continue compliance with National Flood Insurance Program.

Strategies to Continue NFIP Compliance:

1. Work with the MN DNR and FEMA to modernize floodplain maps.
2. Work with the MN DNR to review and update the Floodplain Management Ordinance as required.
3. Work with the MN DNR on all development applications in identified Flood Hazard Areas.
4. Modify the current Building Permit Application by adding a “checkbox” that indicates Flood Hazard Areas.
5. Discourage zoning variances in Flood Hazard Areas.

Granite Falls

The City of Granite Falls utilizes digital FIRM maps dated November 1978, to illustrate the location of 100 and 500-year floodplain boundaries within municipal limits. To prevent future development in the 100-year floodplain, Granite Falls passed a Floodplain Management Ordinance in 1991 that is actively updated as the MN DNR instructs. The process Granite Falls utilizes to monitor potential development in the 100-year floodplain is similar to Canby. Granite Falls has citizens file a building permit with the City and the building inspector reviews each permit individually through a list of requirements. One of the first requirements is for the building inspector to determine whether or not the building site is within the 100-year floodplain and what type of development is proposed. In the event that the structure is within the 100-year floodplain the building inspector sends the permit application to the MN DNR Area Hydrologist to verify the location of the building site and its proximity to the 100-year floodplain. In some cases, the MN DNR Area Hydrologist visits with building permit applicants to discuss what type of development is allowed on their land if it is in within the 100-year floodplain for educational purposes. Once the MN DNR Area Hydrologist makes a finding and submits it to the City, the City then responds accordingly to the building permit applicant.

The City of Granite Falls has demonstrated a commitment to flood mitigation after the major flood in 1997 that caused a devastating impact on the City. Shortly after the 1997 Flood, a Section 205 Flood Control Study was prepared by the U.S. Army Corps of Engineers with the objective of determining the feasibility of developing a small flood control project in Granite Falls. The results of the study did not meet the Corps of Engineers’ cost/benefit ratio and no permanent flood control projects were recommended. To solicit public input into future flood fighting measures, the Granite Falls City Council held a series of community meetings in 2001 where property owners in the floodplain were invited to attend and offer input. These meetings focused on the realization of acquisitions and relocations of both residential and commercial properties. In late fall of 2001, the Granite Falls City Council commissioned a Hazard Mitigation Study to be completed through funding by the MN DNR and FEMA. The objective was to identify, evaluate and prioritize public health, safety and property damage risks and to develop a plan for implementation of mitigation strategies. The study was completed in January 2002 and updated in September 2003 and is now known as the Locally Preferred Plan. To coordinate efforts for flood mitigation, the City Council appointed a Flood Mitigation Task Force to develop a Final Concept Plan for the downtown commercial district and impacted residential areas. This plan is used to lobby at both state and federal levels for additional flood mitigation dollars. Below are seven strategies that the City of Granite Falls intends to complete as methods to continue compliance with National Flood Insurance Program.

Strategies to Continue NFIP Compliance:

1. Work with the MN DNR and FEMA to modernize floodplain maps.
2. Work with the MN DNR to review and update the Floodplain Management Ordinance as required.
3. Work with the MN DNR on all development applications in identified Flood Hazard Areas.
4. Modify the current Building Permit Application by adding a “checkbox” that indicates Flood Hazard Areas.
5. Discourage zoning variances in Flood Hazard Areas.
6. Encourage all property owners in Flood Hazard Areas to purchase flood insurance.
7. Routinely update the Flood Damage Reduction Plan for Granite Falls and continue to acquire, relocate, and remove structures from the 100-year floodplain.

Porter

The City of Porter has approximately 14 acres in 100-year floodplains within municipal limits. Currently, the land use of the floodplains is agricultural and no future development is slated for this area. Porter does not yet have a Floodplain Management Ordinance, but intends to pass an ordinance within the upcoming year. Porter does routinely work to maintain their stormwater system and culverts to keep them free of ice jams throughout the winter season.

Clarkfield

The City of Clarkfield is participating in the NFIP program; however there are no 100 or 500-year floodplains located in city limits. Clarkfield does not have a Floodplain Management Ordinance and does not intend to pass one due to the nonexistence of flood-prone areas. However, Clarkfield does continually work to keep their stormwater sewer system updated and maintain their culverts to reduce flash flood opportunities.

Yellow Medicine County

Yellow Medicine County utilizes digital FIRM maps dated November 1978, to illustrate the location of 100 and 500-year floodplain boundaries within the unincorporated areas of the county. To prevent future development in the 100-year floodplain, Yellow Medicine County passed a Floodplain Management Ordinance in 1993 that is actively updated as the MN DNR instructs. The permitting process in Yellow Medicine County is slightly different from Canby and Granite Falls. A permit application is completed by an applicant and is reviewed by the Zoning Administrator. The Zoning Administrator reviews the digital FIRM maps to determine whether a property is in the floodplain and what type of use the applicant proposes. The Zoning administrator determines which permits are necessary. If needed, the permits are then brought to the Planning Commission and later the County Commission for approval. If the use is not permitted, the responsibility falls to the applicant to hire a surveyor and get elevation data of the property and submit the information to FEMA. The purpose would be to attain a document from FEMA to determine whether or not the property is in the floodplain. If this ruling is made, then the application is routinely processed. If the ruling is not made, then applicant may apply for a conditional use permit with additional standards determined in the Floodplain Management Ordinance; and must be approved by both the Planning Commission and County Commission.

In addition to the Floodplain Management Ordinance, the Yellow Medicine County Comprehensive Plan discusses numerous strategies and goals committing to reduce development in flood-prone areas and developing practices and standards for new development and agricultural practices along shorelands, wetlands, and floodways to preserve the natural environment. Further the Yellow Medicine County Emergency Operations Plan emphasizes organized response to handling large flood situations in the County. On the next page are five strategies that Yellow Medicine County has committed to in order to continue with NFIP compliance.

Strategies to Continue NFIP Compliance:

1. Work with the MN DNR and FEMA to modernize floodplain maps.
2. Work with the MN DNR to review and update the Floodplain Management Ordinance as required.
3. Work with the MN DNR on all development applications in identified Flood Hazard Areas.
4. Discourage zoning variances in Flood Hazard Areas.
5. Encourage all property owners in Flood Hazard Areas to purchase flood insurance.

Repetitive Loss Structures

Repetitive loss structures are those structures which have sustained damages on two separate occasions of at least \$1,000 each have been paid under the National Flood Insurance Program (NFIP) within a ten-year time span for which the cost of repairs at the time of the flood meets or exceeds 25 percent of the market value of the structure before the damage occurred. Currently, within Yellow Medicine County, there are five repetitive loss structures all located within Granite Falls, Minnesota. Included in these properties are two residential properties, one government-owned buildings, and one business. The two residential properties are located in the 500-year floodplain and the one government structure is located in the 100-year floodplain. The business is not located in either the 100-year or 500-year floodplains. The address, ownership and location of all repetitive structures are identified by the Yellow Medicine County Planning and Zoning Department, although their specific location will not be identified in this plan.

The general land use trend within the repetitive loss property area is a combination of residential properties and parks/green space in Granite Falls. Unique natural features found in the 100-year floodplain in Granite Falls include the Minnesota River, granite rock outcroppings, parks, and natural prairie wetlands areas. Granite Falls has a floodplain ordinance passed in 1991 that prohibits future development opportunities within the 100-year floodplain. There are currently no development limits in the 500-year floodplain. Granite Falls has actively pursued flood acquisition funding from both FEMA and the MN DNR. The most recent acquisitions have been eight residential properties that were previous repetitive loss properties.

PRIORITIZING STRATEGIES

Members of the Yellow Medicine County Hazard Mitigation Task Force completed an online/print survey in order to indicate which strategies they felt were the most important in each hazard category. Using these survey results, the Emergency Manager and RDC staff created a preliminary “Prioritized Hazards List” for natural hazards. At the fourth Task Force Meeting in Clarkfield on March 26th, 2015, the Local Task Force solidified their priorities by discussing the strategies that were included on the list, and those that were not. Strategies that were a high priority for the Local Task Force contained mitigation measures for violent storms and extreme temperatures, flooding, and wildfire. Based on the “Hazard Priority Levels” in chapter 4, violent storms and extreme temperatures (i.e. summer weather, winter weather, and tornados) and flooding were determined to be moderate hazards in Yellow Medicine County. Wildfire was determined to be a low risk within the county. Any steps taken to minimize the impacts of these types of disasters could prevent a sizeable amount of damage and save lives.

The Local Task Force and the Yellow Medicine County Emergency Manager used the following criteria to prioritize strategies according to need and feasibility. Although some hazards may be a high risk for the county, it did not guarantee a strategy addressing said hazard would also rank high or take priority.

- Current strategies – Could a current strategy be supplemented or enhanced?
- Costs – What is affordable at this time? Are there current funds addressing the hazard or strategy? Does it make sense to delay or does it only postpone higher costs and create other costs? Will it ever be affordable?
- Available resources – At this time, what funds are available? Will there be additional funds in the future? Are there other projects that take a higher priority?
- Length of project – Some projects could be addressed quickly and require minimal investment in time even though it may be fiscally costly.
- Compatibility with other plans – Is the project a high priority in other plans? Could the project be addressed collaboratively for efficiencies in resources? Would there be unnecessary duplication?
- Available information – Can a good decision be made with the current information? Is more research needed or does it make sense to wait for a current study or development for more information before making a decision?
- Impact – Some hazards can be impacted more by mitigation than others (i.e. using strategies to reduce flooding rather than strategies to reduce tornados).

Table 5.6 YMC Prioritized Strategies (Natural Hazards)

Ranked	Hazard	Strategy	Affected Participating Jurisdiction
1	Violent Storms & Extreme Temperatures	Inventory and assess adequacy of the county civil defense siren system. Add sirens to cities without complete siren coverage, provide backup power to all sirens, and replace malfunctioning sirens.	County Emergency Manager, Cities of Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
1	Violent Storms & Extreme Temperatures	Build safe rooms at city, county, and state campgrounds and parks, and other locations of unprotected populations (i.e. schools, manufactured home parks, all recreational parks, apartment buildings, nursing homes, medical facilities, etc.) to protect users from violent storms.	All Cities and County, County Emergency Manager
1	Violent Storms & Extreme Temperatures	Each city should meet annually with the County Emergency Manager, emergency personnel (fire, police and ambulance), and representatives from nursing homes, schools and hospitals to assess storm safety procedures including safe rooms.	All Cities and County
1	Violent Storms & Extreme Temperatures	Research and obtain funding for implementing cell phone notifications for severe weather events and other hazardous events.	County Emergency Manager, County
2	Flooding	Identify necessary resources for flood emergencies in the region and contract for assistance.	County Emergency Manager, Cities of Canby, Clarkfield, Granite Falls, and Porter
2	Flooding	Work with state agencies, local governments, and emergency managers to address flooding issues as a region.	County Emergency Manager, Cities of Canby, Clarkfield, Granite Falls, and Porter
2	Flooding	Move the Granite Falls Fire Hall outside of the floodplain.	City of Granite Falls, FEMA, Fire Association
3	Wildfire	Work with the Minnesota DNR to include prescribed burning on all county lands and parks. Work with FSA to educate landowners about cost share funding available for controlled burns on CRP and CREP lands. Provide regulations in conservation plantings that consider controlled burns in the future.	County SWCD, FSA, DNR
3	Wildfire	Encourage DNR to give training locally. Look for funds for training if necessary.	DNR, All City Fire Departments

CHAPTER 6: GOALS, OBJECTIVES, AND STRATEGIES FOR MANMADE/TECHNOLOGICAL HAZARDS

OVERVIEW

The following table outlines the goals, objectives and mitigation strategies for man-made technological hazards important to Yellow Medicine County. The goals are used as a framework for the objectives and mitigation strategies, which in turn, provide specific information on how mitigation decisions should be made. The goals, objectives, and strategies are based on the issues identified by the task force and the risk assessment in this plan.

DEFINITIONS

Goals are general statements. **Objectives** are action statements and start with an action verb. **Strategies** support the action of the objective.

The **Time Frame** was determined by the task force and the County Emergency Manager as an estimated timeline in which to complete the strategy.

The **Time Frame – Recurring** is a strategy type that does not have a specific length of time. Once the strategy has been completed, the responsible entity will re-start the strategy.

Responsible Entity is the entity in charge of initiating and completing the strategy identified. This was determined by the task force and County Emergency Manager as the most likely entity to complete the strategy.

The **Estimated Cost** was an educated guess of the cost of each strategy. Some strategies would not cost extra and were denoted "--". Some costs were not known and denoted as "unknown".

The **Funding Partner** is a potential partner for the county/city to obtain funding from in order to complete a strategy.

GENERAL MITIGATION VISION

"The county will strive to work with surrounding communities and local emergency responders to create and implement a proactive and results-oriented all-hazard mitigation plan that will make the county and region a safer and more sustainable place to live by protecting and enhancing the resources of the county as they relate to hazards that may have an impact in the future."

DEVELOPMENT OF STRATEGIES

To determine strategies for each hazard identified in the risk assessment (Chapter 4) small group problem-solving techniques were used. Once the hazards most likely to affect Yellow Medicine County were identified and prioritized, the task force assembled to review these hazards and their rankings and identify strategies to address mitigation for each hazard. Past hazard activities in the county influenced strategy development and strategy ranking (i.e. 1997 and 2001 flooding). In many cases, as the hazards were identified for the inventory, strategies were also discussed, providing a good starting point for the discussion.

The following outlines the plan's strategy development process. 1) Working toward group consensus, each hazard was reviewed individually. 2) Participants offered suggestions and input which stimulated a lively discussion as part of the planning process. All suggestions were considered and recorded by the facilitator. 3) A limited amount of time was set on each hazard by the facilitator to move the group forward. 4) Debate followed before the group was asked to decide if it should be part of the plan – group consensus was needed. 5) The group noted they could not be totally inclusive – some strategies may not even be considered and others may not be feasible.

General Criteria

- | | |
|--------------------------|------------------------------------|
| 1. History | 5. Effectiveness |
| 2. Successful Strategies | 6. Building on what already exists |
| 3. Need | 7. Legal Authority |
| 4. Risks | 8. Environmental Impact |

Cost/Benefit Criteria

- | | |
|------------------------|---|
| 1. Costs/Efficiencies | 4. Overall Impact |
| 2. Economic Impact | 5. Resources Needed (Social & Fiscal) |
| 3. Budget Requirements | 6. Benefits Provided by Project (Social & Fiscal) |

Identifying costs that would be attached to each strategy was the most difficult part of the process. Due to limited time and resources to develop the plan it wasn't feasible to spend a lot of time on estimating the costs. It is critical for the Board to constantly be evaluating the costs as part of implementation and maintenance for the All-Hazard Mitigation Plan. Strategies that dealt with rural areas seemed harder to include in the plan – more costly, harder to regulate, and would need population buy-in. Many strategies are costly, labor intensive, time consuming and it is difficult to identify the lead for the strategy. It was determined that the Emergency Manager will perform a cost-benefit review for all potential future project applications. Participants in the planning process agreed that to implement an ordinance or regulation was not the difficult part of certain strategies – would it be possible and feasible to follow-through? Participants started with strategies that were manageable to see notable progress – “baby steps”. It was reasonable to include strategies that have been started, but not yet completed.

Table 6.1 YMC & Cities Completed Strategies in Past 10 Years for Manmade/Technological Hazards

Hazard	Strategy	Responsible Entity
Wildfire	Create a mutual aid agreement between DNR and local fire departments to organize response to large wildfires.	West Central Firefighters Association, Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Wildfire	Encourage DNR to give training locally.	Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Wildfire	Do an inventory of wildfire equipment available and look for grants for additional and updated equipment when necessary.	Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Wildfire	Remove debris and dead vegetation around camping areas on an annual basis.	Yellow Medicine County, Canby
Fire	Ensure that building codes include alarms and sprinkler systems as requirements on all commercial and industrial buildings.	Clarkfield, Granite Falls, and Stony Run Township
Fire	Purchase equipment that is needed to fight fires, such as fire trucks and PTE equipment.	Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Fire	Update communication equipment such as pagers to communicate with dispatch and other fire departments.	Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Fire	Purchase gas meter for fire department for use by community.	Porter
Fire	Manage abandoned buildings.	Porter
Hazardous Materials	Develop Mass Evacuation Procedures for a hazardous materials incident.	Yellow Medicine County Emergency Manager
Hazardous Materials	Develop a plan/policy to contend with meth labs in the county. Promote and enforce building codes that improve protection from hazardous events.	Yellow Medicine County Law Enforcement, Granite Falls, Clarkfield
Hazardous Materials	Developed a City Evacuation Plan and practice the plan in event of ammonia leaks.	Wood Lake
Hazardous Materials	Continue to participate in regional exercises that test local plans and interaction between local agencies. Participate in "High Angle Rescue" Team – a countywide organization for emergency response situations.	Wood Lake
Water Supply Contamination	Build a new Water Treatment Plant and dig a new well due to arsenic found in water supply.	Hanley Falls
Water Supply Contamination	Establish a program to install backflow protection at the water meter service which would not allow anything to go back into water system.	Lincoln Pipestone Rural Water
Civil Disturbance/Terrorism	Install backflow protection at the water meter service which would not allow anything to get back into the water system.	Granite Falls
Civil Disturbance/Terrorism	Develop security for county and all high profile cases.	Yellow Medicine County Law Enforcement
Civil Disturbance/Terrorism	Televisе City Council Meetings.	Canby
Civil Disturbance/Terrorism	Develop response plan for agro-terrorism.	Yellow Medicine Zoning Administrator
All Hazards	All homes are easily identifiable with visible house numbers and street signs.	Canby, Clarkfield, Granite Falls, Hanley Falls, St. Leo, Wood Lake

Table 6.2 YMC & Cities: Manmade / Technological Strategies – No Longer Relevant

Hazard	Strategy	Responsible Entity
Fire	See Wildfire Section.	Clarkfield, Canby, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake FDs
Reasoning: This is duplication of strategies. The Wildlife Section has a dedicated Goal and multiple Objectives/Strategies for preventing wildfires from affecting structures.		
Fire	Ensure that building codes include alarms and sprinkler systems as requirement on all commercial and industrial buildings.	Canby, Echo, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Reasoning: These cities do not have funding available to pay for a building inspector and do not have building codes.		
Fire	Provide gas meters for Fire Departments for use by the community.	Clarkfield, Canby, Echo, Granite Falls, Hanley Falls, Hazel Run, St. Leo, Wood Lake FDs
Reasoning: The city Fire Departments are not in agreement over the use of gas meters. Many stated that they are very costly and continually need to be re-calibrated, which increases the overall price. Further, there are liability issues at stake for the Fire Departments concerning the use of the gas meters.		
Fire	Enforce building codes. Update City Council of citations.	Canby, Echo, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Reasoning: These cities do not have funding available to pay for a building inspector and do not have building codes.		
Fire	Adopt a plan of action for the city to deal with abandoned buildings. Adopt ordinance for city to be able to take dilapidated, abandoned buildings if necessary.	Clarkfield, Canby, Echo, Granite Falls, Hanley Falls, Hazel Run, St. Leo, Wood Lake
Reasoning: Cities plan to work on individual actions for undetermined times. This strategy has been combined with another to remove duplication.		
Hazardous Materials	Adopt an ordinance for landlords to clean up meth labs before residence is occupied again. Educate business owners and employees to be aware of possible meth purchases.	Yellow Medicine County, Clarkfield, Canby, Echo, Granite Falls, Hanley Falls, Hazel Run, St. Leo, Wood Lake
Reasoning: The County and cities are covered for meth labs under hazardous wastes that fall under the Environmental Protection Agency jurisdiction.		
Civil Disturbance / Terrorism	Televisе City Council Meetings.	Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, St. Leo, Wood Lake
Reasoning: These cities do not televise City Council Meetings and do not intend to do so in the future.		
All Hazards	Work to train the CERT team to be ready to work and train volunteers during disasters and to develop research and outreach materials.	Clarkfield, Canby, Echo, Granite Falls, Hanley Falls, Hazel Run, St. Leo, Wood Lake
Reasoning: These cities do not have the funding available to create a CERT Team and have asked to be removed from this strategy.		

GOALS, OBJECTIVES, AND STRATEGIES
Infectious Disease

Goal 1: Reduce the threat of infectious diseases through education and awareness.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Support and maintain programs that keep the county healthy and safe from infectious diseases.	A. Adopt all Public Health Emergency Guidelines as completed.	Recurring	Countryside Public Health and County Emergency Manager	--	--
2. Centralize data and information in order to educate the public.	A. Educate the public of websites and data centers for accurate and current information and through the risk communication service.	Recurring	Public Health and County Emergency Manager	--	--
	B. Continue cooperation with Emergency Manager, Countryside Public Health, and hospitals/clinic staffs.	Recurring	Countryside Public Health, County Emergency Manager, Hospital and Clinic Staff	--	--
3. Ensure all community members receive updated public health and emergency information. *New Objective	A. Partner with ECHO Minnesota to provide public health and emergency information in the languages of all immigrants and refugees. *New Strategy	Recurring	Countryside Public Health, County Emergency Manager, Hospital and Clinic Staff		

Goal 2: Improve the effectiveness and quality of the various efforts addressing infectious diseases that have the potential to impact the county.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Maintain and update material, plans, and agreements for addressing infectious diseases.	A. Work on guidelines to keep EMS informed of possible outbreaks. Work with State of Minnesota on Quarantine/Isolation plan.	Recurring	Countryside Public Health	--	--

Fire

Goal 1: Protect structures from fire.

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Ensure that Fire Departments have adequate equipment to fight fires.	A. Purchase equipment that is needed such as new fire trucks and PTE equipment.	Recurring	All City Fire Departments	\$70,000 for PPE/FD; \$200,000 for trucks	FEMA
	B. Update communication equipment such as pagers to communicate with dispatch and other fire departments. Computers are needed in emergency vehicles.	Recurring	All City Fire Departments	\$40,000	FEMA

Goal 2: Provide safety to residents

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Focus education measures toward residents living in all Yellow Medicine County Cities.	A. Provide school programs to youth, focusing on stoves, smoke detectors, smoking and evacuation and education to homeowners, focusing on carbon monoxide poisoning, evacuation and smoke alarms. Work with insurance companies on education and demonstrate using fire extinguishers.	Recurring	All City Fire Departments	--	--

Fire

Goal 3: Reduce building hazards.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Keep electrical units up to code.	A. Enforce building codes. Keep city council updated on citations.	Recurring	Cities of Clarkfield and Granite Falls	--	--
2. Manage abandoned buildings.	A. Inspect abandoned buildings and remove as needed.	Recurring	All Cities	\$4,000-\$10,000	--
3. Provide residents with adequate knowledge of fire safety.	A. Encourage public safety day and work with ongoing programs to promote fire safety such as National Night Out and Fire Prevention Week.	Recurring	All Cities	\$2,000	--

Hazardous Materials

Goal 1: Improve the effectiveness and quality of the various efforts addressing hazardous material that may impact the county.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Maintain and update material, plans, and agreements for addressing hazardous material and evacuation.	A. Review and update the Yellow Medicine County Emergency Operations Plan that outlines procedures for dealing with hazardous material and evacuation of citizens on an annual basis. Update the Water Plan to address all hazardous material in the county as it relates to ground and surface water. Continue to expand the use of mutual aid agreements and memoranda of understanding to improve coordination among state, local and federal agencies and appropriate private sectors.	Recurring	County Emergency Manager and County Zoning Administrator	--	--
2. Ensure there are no unnecessary hazardous materials within city limits.	A. Enact city zoning ordinances that prohibit vehicles carrying hazardous materials from sitting in cities overnight.	1 year	All Cities	--	--

Hazardous Materials

Goal 2: Develop a County Information Service that provides useful and factual information about hazardous material located and transported through the county.

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Support policies and programs that assist in creating factual and timely information about hazardous material in the county.	A. Provide staff resources to fire departments to assist them in identifying areas of high risk involving hazardous material. Require that hazardous materials locations are readily available to local fire departments. Utilize the Geographic Information Systems capability to map locations of fixed facilities using hazardous materials and associated transportation corridors. Map known locations of hazardous material/waste sites by working directly with the Pollution Control Agency. Develop a local home safety program to educate about disposable hazardous material.	Recurring	County Emergency Manager	\$24,000	EPA / MnDNR

Hazardous Materials

Goal 3: Address inconsistencies and county shortcomings in dealing with a hazardous materials event.

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Implement procedures or programs that address gaps or deficiencies in dealing with hazardous materials.	A. Develop the capability to integrate plume modeling software with GIS technology to model potential hazards created by releases of liquid, gaseous or airborne solid hazardous materials.	1-2 years	County Emergency Manager	\$30,000	HSEM

Hazardous Materials

Goal 4: Improve overall preparedness and equipment for handling hazardous events.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Adopt new technology and obtain training to improve the county's ability to respond to a disaster.	A. Need proper personal protection equipment to respond to hazardous materials disasters for Fire Departments, Law Enforcement, and Ambulance/EMT Departments as applicable to each city.	2 years	County and all Cities	\$5,000	FEMA
	B. Continue to participate in regional exercises that test local plans and interaction between local agencies.	Recurring	County and all Cities	\$4,000/year	--
	C. Continued training in the use of the Nation Incident Management System for all hazard materials incidents that may occur in the county.	Recurring	County	\$3,500	Fire Grant/ Dept. of Justice
	D. Ensure that all Emergency Responders participate in Rail Car Incident Response Training. *New Strategy	Recurring	County Emergency Manager, All City Fire Departments	--	Railroad officials, FEMA
	E. Encourage that emergency responder groups, fire department, and emergency managers are trained to at least the Hazardous Materials Awareness level.	Recurring	County	\$4,000	HSEM/ Dept. of Justice
	F. Ensure that the first responder groups conduct the required terrorism and hazardous materials training and maintains current records on all completed training.	Recurring	County	\$10,000	HSEM/ Dept. of Justice
	G. Create Standard Operating Procedures for how to handle hazardous events. *New Strategy	1 year	County	--	--
	H. Purchase sensor to detect anhydrous ammonia leaks.	3 years	Wood Lake/ Equity Elevator	\$500	--

Water Supply Contamination

Goal 1: Protect the quality of the county's ground water resources.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Reduce contamination from feedlots.	A. Continue to monitor and regulate locations of feedlots and map with GIS.	Recurring	County Zoning Administrator	--	--
2. Reduce contamination into private wells.	A. Encourage the use of padlocks or other security devices on private wells and provide educational materials on testing private wells.	Recurring	County Zoning	--	--
3. Reduce contamination into community water systems.	A. Provide more security at the Burr Treatment plant.	Recurring	Lincoln Pipestone Rural Water	\$50,000	USDA Rural Development
4. Minimize contamination of ground water from unused or abandoned wells.	A. Continue the abandoned well sealing program within the county.	Recurring	County Zoning Administrator	--	--
5. Reduce contamination from herbicide and pesticide use.	A. Look at current water plan to see if improvements can be made to protect the water supply.	Recurring	County Zoning Administrator, County Planning, Watershed Districts	--	--
6. Reduce contamination from individual septic systems.	A. Inspect and enforce upgraded septic systems for homeowners.	Recurring	County Zoning Administrator	--	--
	B. Encourage rural landowners to utilize the Agricultural Best Management Practices (Ag BMP) Loan Program for updates to septic systems.	Recurring	County	--	--
	C. Offer low-interest loans through the county for homeowners to upgrade septic systems. *New Strategy	Recurring	County	--	--

Water Supply Contamination

Goal 2: Protect residents from contaminated ground water.

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Provide adequate drinking water in the event of ground water contamination.	A. Identify alternate drinking water sources during an emergency in the Emergency Operations Plan.	Recurring	County Emergency Manager	--	--
	B. Connect with Lincoln Pipestone Rural Water as a backup water option.	3-5 years	City of Clarkfield	Unknown	USDA – Rural Water
	C. Build new city owned water treatment plant.	3-5 years	City of Clarkfield	Unknown	USDA – Rural Water
	D. Make necessary updates and improvements to wastewater and drinking water system.	2-5 years	City of Echo	Unknown	USDA

Goal 3: Focus on efforts in areas more prone to ground water contamination.

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Prevent groundwater contamination.	A. Support cities and public water suppliers in developing and enforcing wellhead protection plans.	Recurring	All Cities, Public Water Suppliers, County Zoning Administrator	--	--
2. Protect the groundwater.	A. Encourage landowners to seal abandoned wells.	Recurring	County Zoning Administrator	Unknown	Unknown

Wastewater Treatment Facility Failure

Goal 1: Protect the quality of the county's ground water resources.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Ensure that all public facilities are working properly.	A. Continue updating sanitary sewer systems and securing funding to make these updates.	Recurring	All Cities	Unknown	USDA
2. Address the threat of human-induced failures.	A. Monitor activities around each city sanitary sewer system.	Recurring	All Cities, Law Enforcement, County Emergency Manager	--	--
3. Educate the public in the event of sewer system failure and any health threats in conjunction to failure.	A. Include in the County's Emergency Plan the necessary steps to take in the event of a wastewater treatment facility failure. Explore mitigation strategies for facility failure to include in management plans.	Recurring	Law Enforcement, County Emergency Manager	--	--
4. Reduce contamination from individual septic tank systems.	A. Establish a county program to update individual septic tank systems and provide inspection as needed.	Recurring	County Zoning Administrator	--	SCDP/ MPCA

Civil Disturbance / Terrorism

Goal 1: Reduce risk to critical government facilities and services.

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Increase the level of security for government facilities and services and in major public areas.	A. Increase security at major public gathering places.	Recurring	County Sheriff Department	--	--
	B. Evaluate the security issues in the county including government, dam, water and safety.	10 years	County Sheriff Department	\$60,000	911 Grants/ HSEM
	C. Develop cyber security plan and cyber risk mitigation plans. Conduct cyber risk and vulnerability assessment.	Recurring	County Emergency Manager	\$30,000	911 Grants/ HSEM
2. Keep city council meetings secure.	A. Have security present and work with legislation to keep weapons out of city council meetings.	Recurring	All Cities	--	--

Goal 2: Decrease vulnerability of regional and state resources in county.

OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Work with state and federal agencies engaged in the statewide domestic preparedness strategy to identify further options for the county.	A. School emergencies should be addressed and drills practiced.	Recurring	Schools	--	--

Transportation

Goal 1: Protect passengers from traffic/train accidents.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Install gates at the Hwy. 59/railroad intersection in Clarkfield.	A. Request the Minnesota DOT to install gates and/or flashing lights at the rail intersection in Clarkfield.	5-10 years	City of Clarkfield	\$200,000	Mn/DOT
2. Increase pedestrian safety on transportation road network.	A. Continue to lobby efforts to rebuild Hwy 59 to include adequate shoulders on roadway.	Ongoing	City of Clarkfield	Staff Time	--
	B. Construct sidewalks along Hwy 59 to connect school with the rest of the Clarkfield community. *New Strategy	2-5 years	City of Clarkfield	Unknown	MnDOT

All Hazards

Goal 1: Look at general ideas that serve the community through any disaster that may arise.					
OBJECTIVES	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner
1. Educate the public.	A. Continue all programs and incorporate new hazards into existing programs. Educate public on insurance for disasters and risk management.	Recurring	All Cities, Emergency Personnel, County Emergency Manager	--	--
2. Ensure that homes are easily identifiable.	A. Make sure all houses have visible street numbers at least 3.5 inches tall. *New Strategy	1 year	All Cities	\$5,000 / City	--
3. Educate citizens on where to go and what to do in event of all hazardous events.	A. Draft an Emergency Operations Plan for fires, chemical spills, severe weather events, and gas leaks.	2-5 years	All Cities	Staff Time	--

PRIORITIZING STRATEGIES

Members of the Yellow Medicine County Hazard Mitigation Task Force completed an online/print survey in order to indicate which strategies they felt were the most important in each hazard category. Using these survey results, the Emergency Manager and RDC staff created a preliminary “Prioritized Hazards List” for manmade/technological hazards. At the fourth Task Force Meeting in Clarkfield on March 26th, 2015, the Local Task Force solidified their priorities by discussing the strategies that were included on the list, and those that were not. Strategies that were a high priority for the Local Task Force contained mitigation measures for hazardous materials, water contamination, and structure fire. These three hazards were determined to be moderate hazards in Yellow Medicine County, indicating greater risk than some of the other hazards. Additionally, any steps taken to minimize the risks of these types of disasters could have a sizeable impact. Although Yellow Medicine County does not have control over what types/amounts of hazardous materials are traveling through the county, they can complete strategies that would minimize risk to communities and citizens in the event of a spill.

The Local Task Force and the Yellow Medicine County Emergency Manager used the following criteria to prioritize strategies according to need and feasibility. Although some hazards may be a high risk for the county, it did not guarantee a strategy addressing said hazard would also rank high or take priority.

- Current strategies – Could a current strategy be supplemented or enhanced?
- Costs – What is affordable at this time? Are there current funds addressing the hazard or strategy? Does it make sense to delay or does it only postpone higher costs and create other costs? Will it ever be affordable?
- Available resources – At this time, what funds are available? Will there be additional funds in the future? Are there other projects that take a higher priority?
- Length of project – Some projects could be addressed quickly and require minimal investment in time even though it may be fiscally costly.
- Compatibility with other plans – Is the project a high priority in other plans? Could the project be addressed collaboratively for efficiencies in resources? Would there be unnecessary duplication?
- Available information – Can a good decision be made with the current information? Is more research needed or does it make sense to wait for a current study or development for more information before making a decision?
- Impact – Some hazards can be impacted more by mitigation than others (i.e. using strategies to reduce flooding rather than strategies to reduce tornadoes).

Table 6.3 YMC Prioritized Strategies (Manmade/Technological Hazards)

Ranked	Hazard	Strategy	Affected Participating Jurisdiction
1	Hazardous Materials	Provide staff resources to fire departments to assist them in identifying areas of high risk involving hazardous material. Require that hazardous materials locations are readily available to local fire departments. Utilize the Geographic Information Systems capability to map locations of fixed facilities using hazardous materials and associated transportation corridors. Map known locations of hazardous material/waste sites by working directly with the Pollution Control Agency. Develop a local home safety program to educate about disposable hazardous material.	County Emergency Manager
1	Hazardous Materials	Review and update the Yellow Medicine County Emergency Operations Plan that outlines procedures for dealing with hazardous material and evacuation of citizens on an annual basis. Update the Water Plan to address all hazardous material in the county as it relates to ground and surface water. Continue to expand the use of mutual aid agreements and memoranda of understanding to improve coordination among state, local and federal agencies and appropriate private sectors.	County Emergency Manager and County Zoning Administrator
1	Hazardous Materials	Ensure that all Emergency Responders participate in Rail Car Incident Response Training.	All Cities
1	Hazardous Materials	Encourage that emergency responder groups, fire department, and emergency managers are trained to at least the Hazardous Materials Awareness level.	County
2	Water Supply Contamination	Support cities and public water suppliers in developing and enforcing wellhead protection plans.	County Zoning Administrator
2	Water Supply Contamination	Look at current water plan to see if improvements can be made to protect the water supply from herbicide and pesticide use.	County Zoning Administrator, County Planning, Watershed Districts
3	Structure Fire	Purchase equipment that is needed such as new fire trucks and PTE equipment.	All City Fire Departments
3	Structure Fire	Provide school programs to youth, focusing on stoves, smoke detectors, smoking and evacuation and education to homeowners, focusing on carbon monoxide poisoning, evacuation and smoke alarms. Work with insurance companies on education and demonstrate using fire extinguishers.	All City Fire Departments

CHAPTER 7: PLAN IMPLEMENTATION & MAINTENANCE

Implementation & Maintenance

The Yellow Medicine County All-Hazard Mitigation Plan is intended to serve as a guide for dealing with the impact of both current and future hazards for all county people and institutions. As such, it is not a static document but must be modified to reflect changing conditions if it is to be an effective plan. The goals, objectives, and mitigation strategies will serve as the action plan. Even though individual strategies have a responsible party assigned to it to ensure implementation; overall responsibility, oversight and general monitoring of the action plan has been assigned to the Yellow Medicine County Emergency Manager. It will be their responsibility to gather a Local Task Force to update the All-Hazard Mitigation Plan on a routine basis. Every two years, the County Emergency Manager will call a meeting to review the plan, mitigation strategies and the estimated costs attached to each strategy. All participating parties of the original Local Task Force and cities will be invited to this meeting. Responsible parties will report on the status of their projects. Committee responsibility will be to evaluate the plan to determine whether:

- Goals and objectives are relevant.
- Risks have changed.
- Resources are adequate or appropriate.
- The plan as written has implementation problems or issues.
- Strategies have happened as expected.
- Partners participating in the plan need to change (new and old).
- Strategies are effective.
- Any changes have taken place that may affect priorities.
- Any strategies should be changed.

In addition to the information generated at the Local Task Force meetings, the County Emergency Manager will also annually evaluate the All-Hazard Mitigation Plan and update the plan in the event of a hazardous occurrence. Two-year updates are due on the anniversary of the plan approval date.

After the second update meeting (four years will have passed), the Yellow Medicine County Emergency Manager will finalize a new Local Task Force to begin the required five-year update process. This will be accomplished in coordination with cities and the entire All-Hazard Mitigation Plan shall be updated and submitted to FEMA for approval (within 5 years of plan adoption). These revisions will include public participation by requiring a public hearing and published notice, in addition to multiple Local Task Force meetings to make detailed updates to the plan.

Public participation for updates is as critical as in the initial plan. Public participation methods that were used in the initial writing will be duplicated for future update processes – direct mailing list of interested parties, public meetings, press releases, questionnaires, and resolutions of participation and involvement. Additional methods of getting public input and involvement are

encouraged such as placing copies of the plan in the Yellow Medicine County Emergency Manager's Office and city offices, in addition to placing the plan on the Yellow Medicine County and UMRDC websites. Further, cities will be encouraged to place a notice on their websites stating the plan is available for review at the city offices. Notifications of these methods could be placed in chamber newsletters, the UMRDC newsletter and newspapers. Committee responsibilities will be the same as with updates.

Chapters 5 and 6 focus on mitigation strategies for natural hazards and man-made/technological hazards. Appendix 2 focuses on city-specific mitigation strategies for both natural and manmade/technological hazards. The All-Hazard Mitigation Plan proposes a number of strategies, some of which will require outside funding in order to implement. If outside funding is not available, the strategy will be set aside until sources of funding can be identified. In these situations, Yellow Medicine County and cities will consider other funding options such as the county's/cities' general funds, bonding and other sources. Based on the availability of funds and the risk assessment of that hazard, the county will determine which strategies should be continued and which should be set aside. Consequently, the action plan and the risk assessment serves as a guide to spending priorities but will be adjusted annually to reflect current needs and financial resources.

This last step requires an evaluation of the strategies identified in the goals and policies framework, selecting preferred strategies based on the risk assessment, prioritizing the strategy list, identifying the entity responsible for carrying out the strategy, and the timeframe and costs of strategy completion. Yellow Medicine County and cities have incorporated the preferred strategies including identification of the responsible party to implement, the timeframe and the cost of the activity with the goals and policies framework.

This plan will be integrated into other Yellow Medicine County plans such as the County Comprehensive Plan, County Water Plan, County Transportation Plan, and the Emergency Operations Plan. Chapter 1 will serve as an executive summary to the All-Hazard Mitigation to be attached to those plans as necessary. The County Board and Emergency Manager will encourage cities to implement their city-specific mitigation strategies in their comprehensive plans, land use regulations, zoning ordinances, capital improvement plans and/or building codes by including mitigation strategies in their plans as listed in Table 7.1 on the following page. Further, as each land use mechanism is updated, mitigation strategies will be evaluated to determine whether they can implement or include them at that time. This evaluation will consist of basic cost-benefit analyses, much like what was used to create the mitigation strategies.

Table 7.1 YMC & Cities - Local Planning Mechanisms

Planning Mechanisms	Jurisdictions
Comprehensive Plan	Yellow Medicine County, Canby, Granite Falls, Echo
Emergency Operations Plan	Yellow Medicine County, Canby
Capital Improvement Plan	Clarkfield, Granite Falls, Canby
Local Water Management Plan	Yellow Medicine County,
Watershed Plan	Yellow Medicine County
Land Use Plan	Yellow Medicine County, Echo
Flood Damage Reduction: Minnesota River at Granite Falls, MN: Locally Preferred Plan	Granite Falls
Zoning Ordinance	Yellow Medicine County, Canby, Clarkfield, Echo, Granite Falls, Hanley Falls, Hazel Run, Porter, St. Leo, Wood Lake
Building Code	Clarkfield, Granite Falls, Stony Run Township
Floodplain Ordinance	Yellow Medicine County, Canby, Granite Falls
Shoreland Ordinance	Yellow Medicine County

Many of these plans or policies can help implement the goals, objectives, and strategies in Yellow Medicine County's All-Hazard Mitigation Plan. The Yellow Medicine County Emergency Manager is responsible for meeting with each city within the County two times throughout the next five years. During these meetings, the Emergency Manager will review all Local Planning Mechanisms and collaborate with the cities to ensure the All-Hazard Mitigation Plan is becoming as integrated into local plans as possible. As adopted versions of Yellow Medicine County's All-Hazard Mitigation Plan will be available at all city offices, during these meetings the Emergency Manager will solicit and collect any public comments relevant to the plan and make a record for the upcoming update process to be discussed at a Local Task Force meeting. These Local Planning Mechanisms are meant to work cooperatively together in order to ensure the health, safety, and welfare of Yellow Medicine County and its cities.

Appendices

Appendix 1: Additional Maps

Map A1.1:	State Overview
Map A1.2:	Yellow Medicine County Civil Divisions
Map A1.3:	Yellow Medicine County Land Cover
Map A1.4:	Yellow Medicine County Hydrology & Drainage
Map A1.5:	Yellow Medicine County Natural Features
Map A1.6:	Yellow Medicine County Population by Census Block
Map A1.7:	Yellow Medicine County Transportation System
Map A1.8:	Yellow Medicine County Feedlot Locations

Appendix 2: City Specific Objective and Strategies

Canby	A2-1
Clarkfield	A2-2
Echo	A2-4
Granite Falls	A2-5
Hanley Falls	A2-6
Hazel Run	A2-8
Porter	A2-9
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Appendix 3: Solved Gaps and Deficiencies

Appendix 4: Additional Hazard Information

Appendix 5: Climatic Conditions for the 1997 Flood Event

Appendix 6: Climatic Conditions for the 2001 Flood Event

Appendix 7: Additional Information on 1997 and 2001 Flood Events

Appendix 8: NOAA Weather Radio Broadcasts

Appendix 9: Normal Annual Precipitation

Appendix 10: Inventory of Hazardous Material Spills

Appendix 11: City Surveys

Appendix 12: Public Participation

Appendix 13: County and City Plan Adoption

Appendix 14: County Capabilities Checklist

APPENDIX 1: ADDITIONAL MAPS

Figure A1.1 State Overview

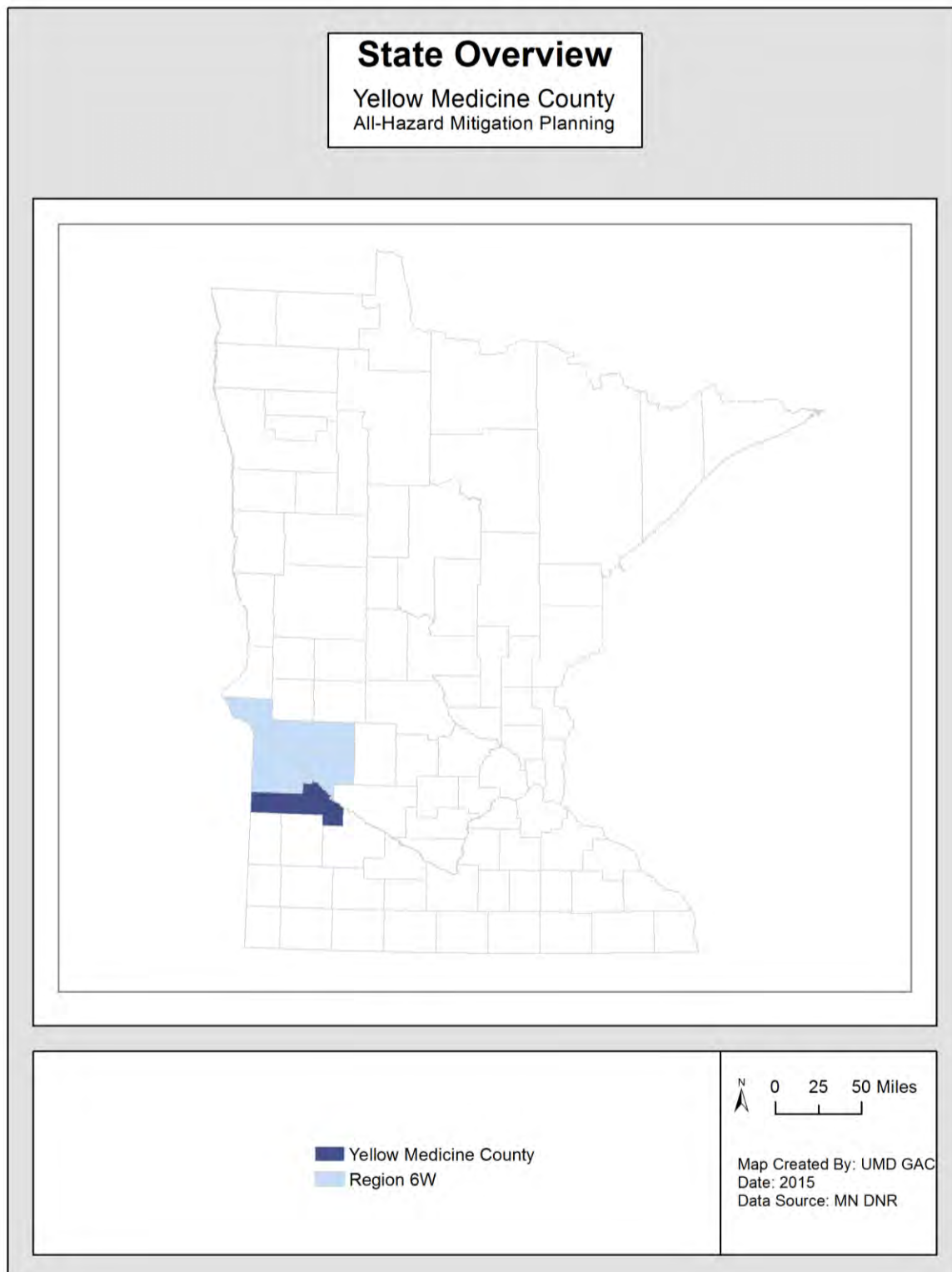


Figure A1.2 Yellow Medicine County Civil Divisions

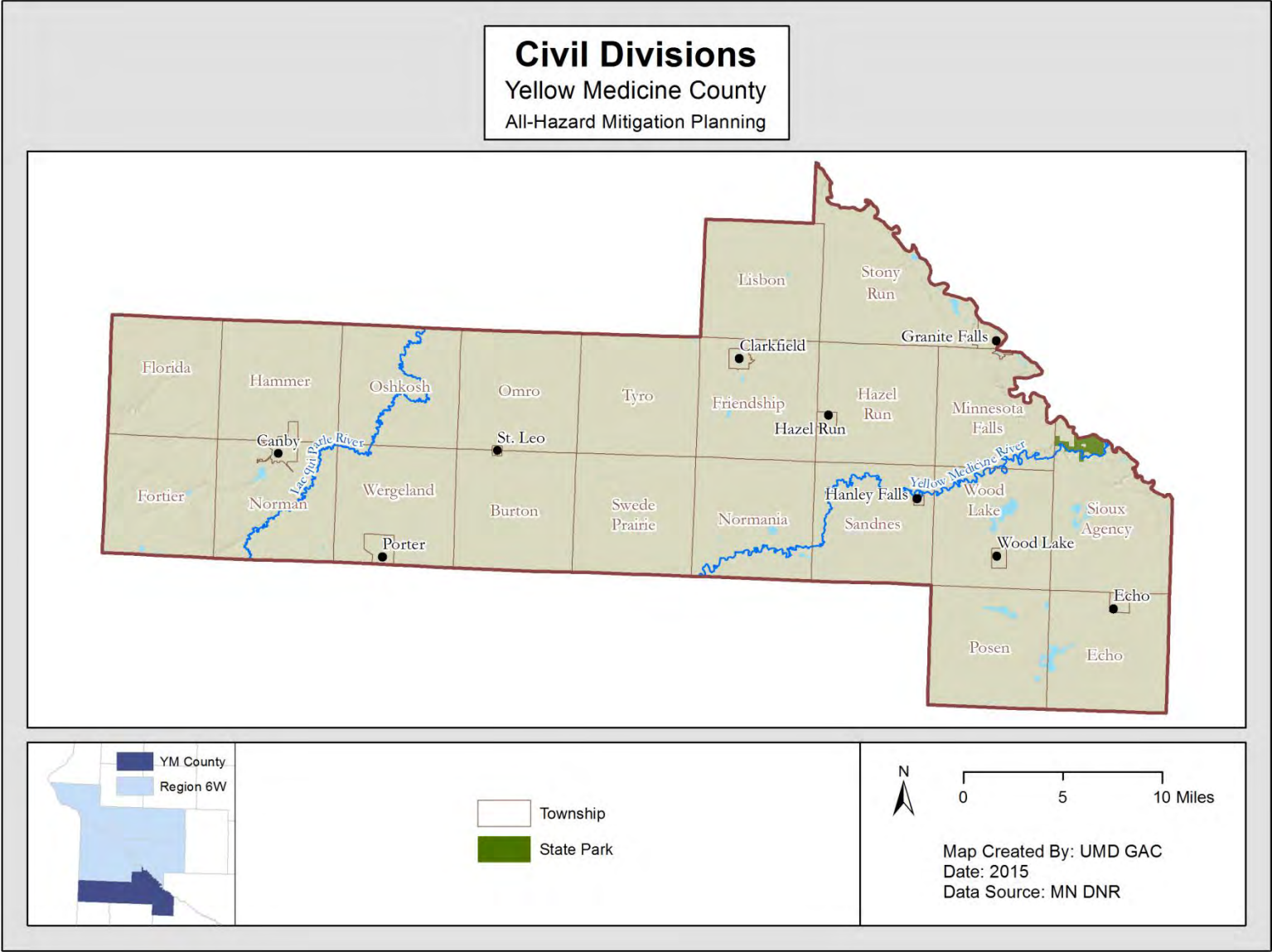


Figure A1.3 Yellow Medicine County Land Cover

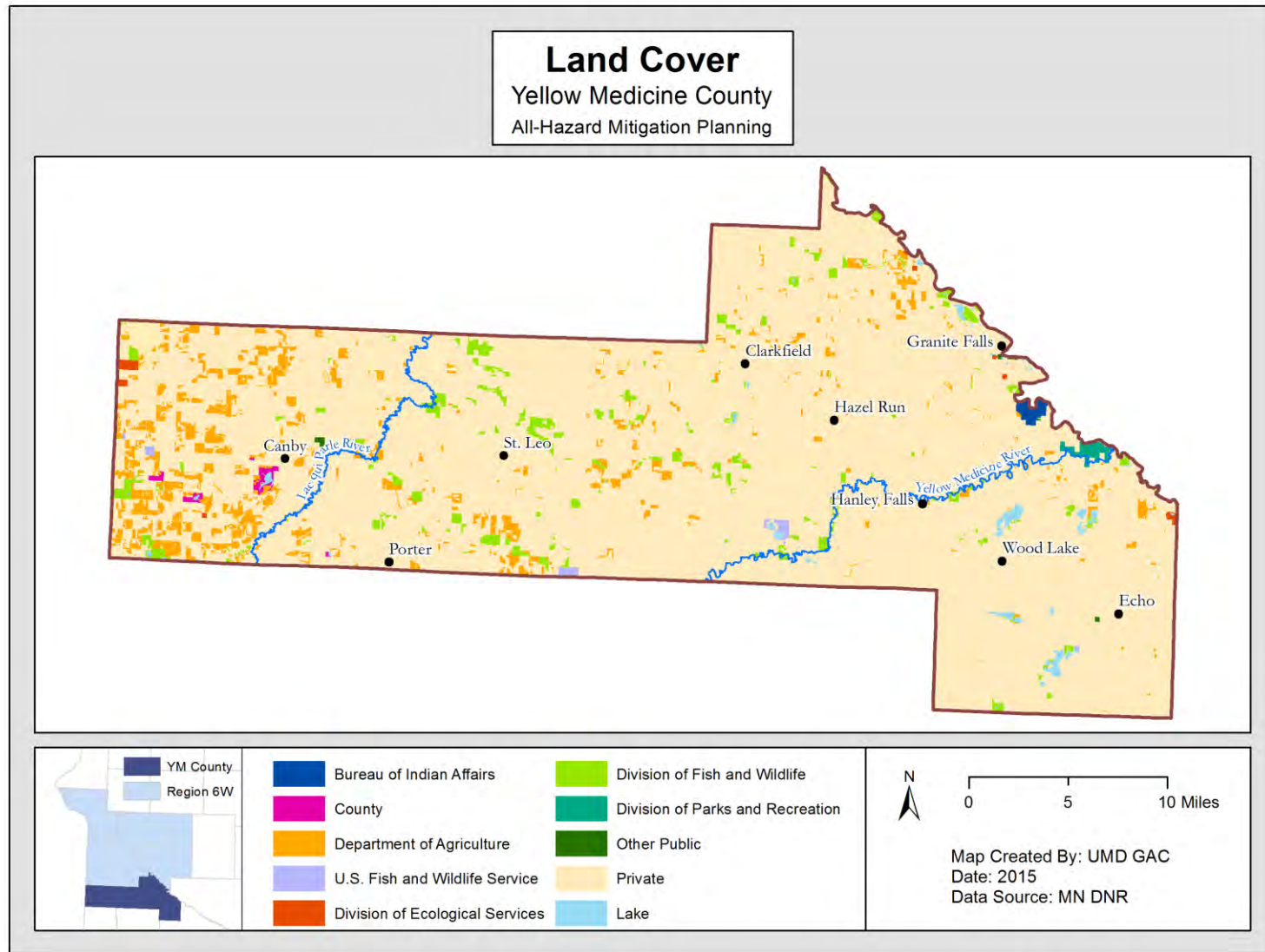


Figure A1.4 Yellow Medicine County Hydrology & Drainage

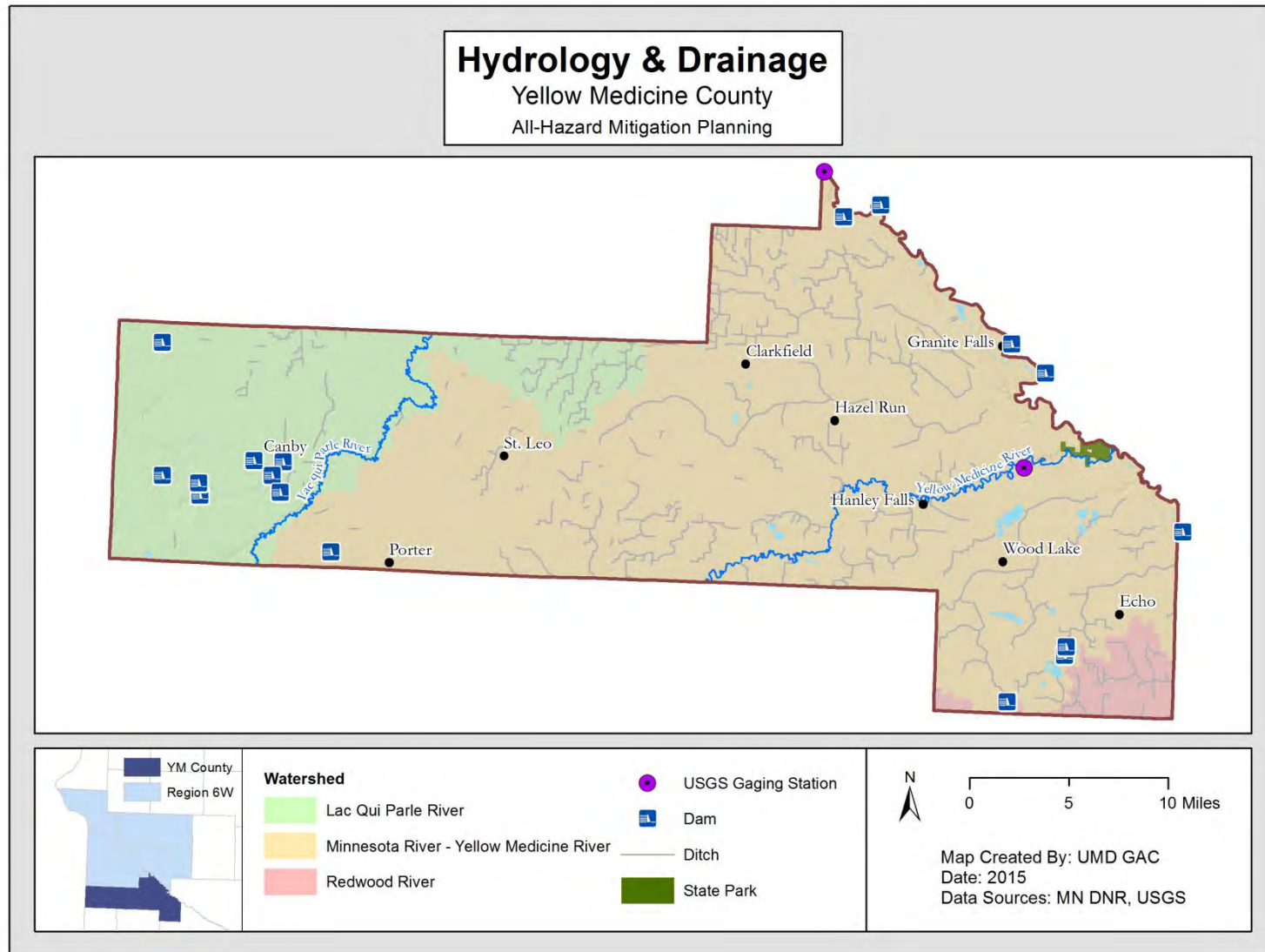


Figure A1.5 Yellow Medicine County Natural Features

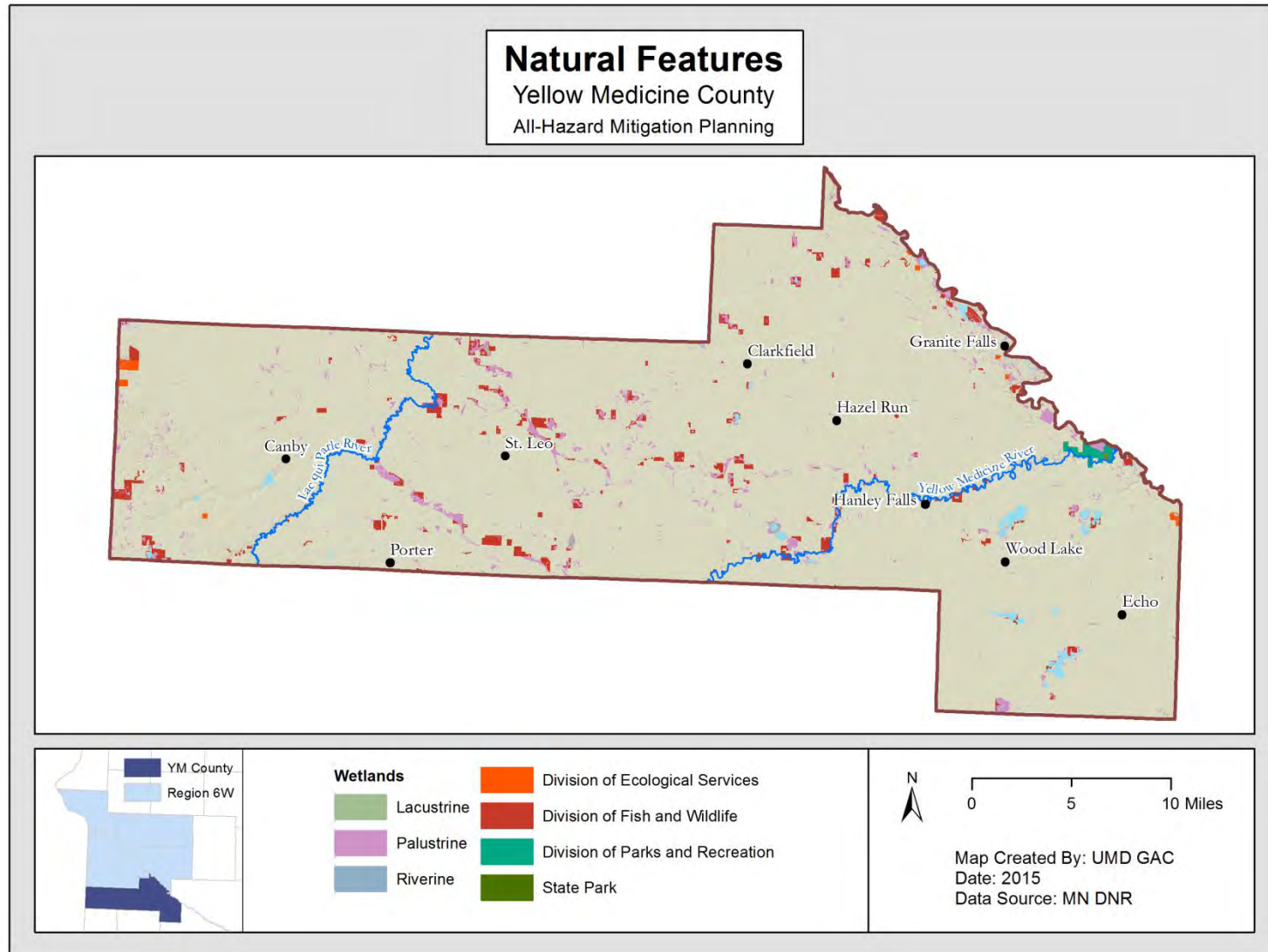


Figure A1.6 Yellow Medicine County Population by Census Block

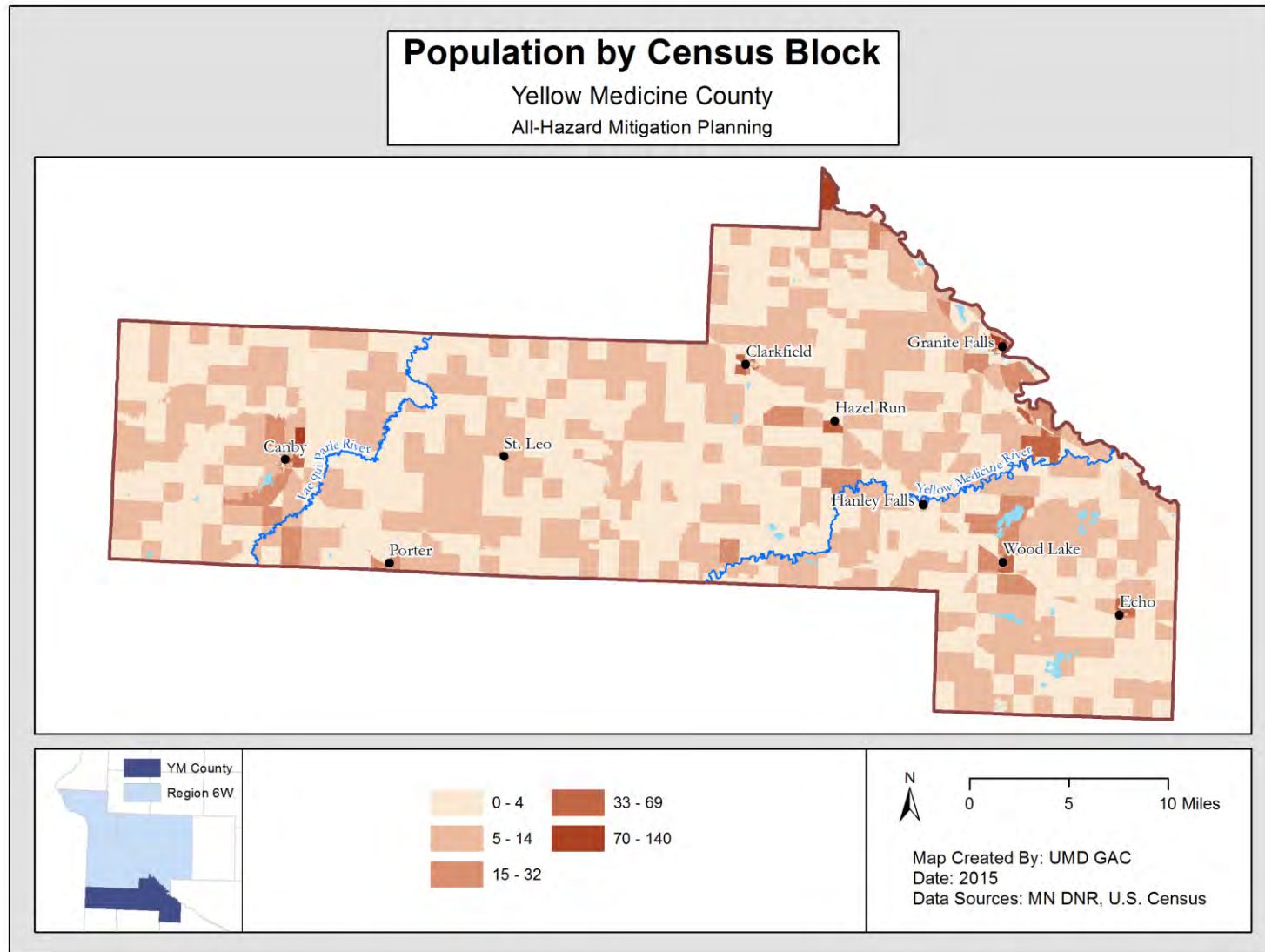


Figure A1.7 Yellow Medicine County Transportation System

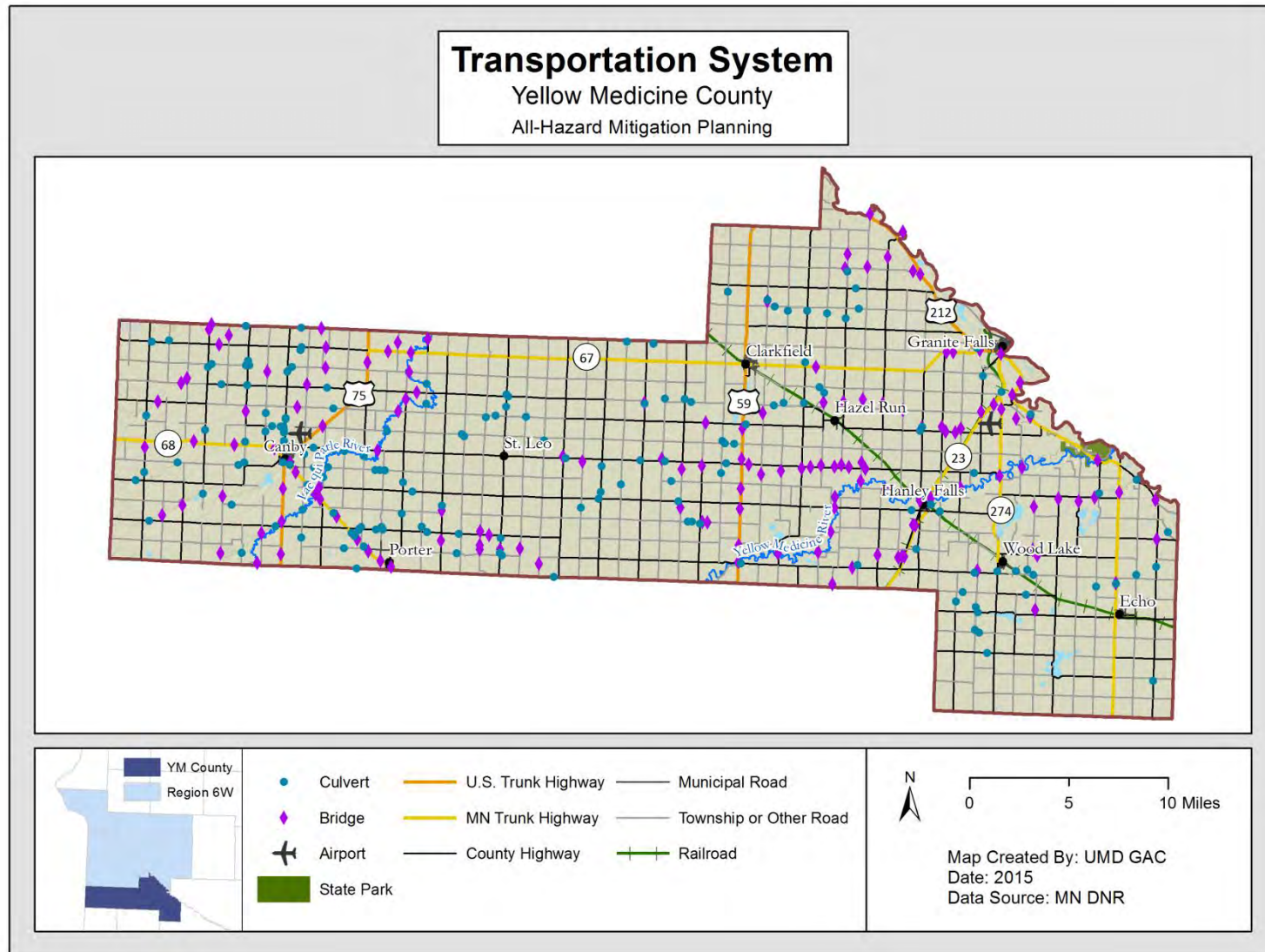
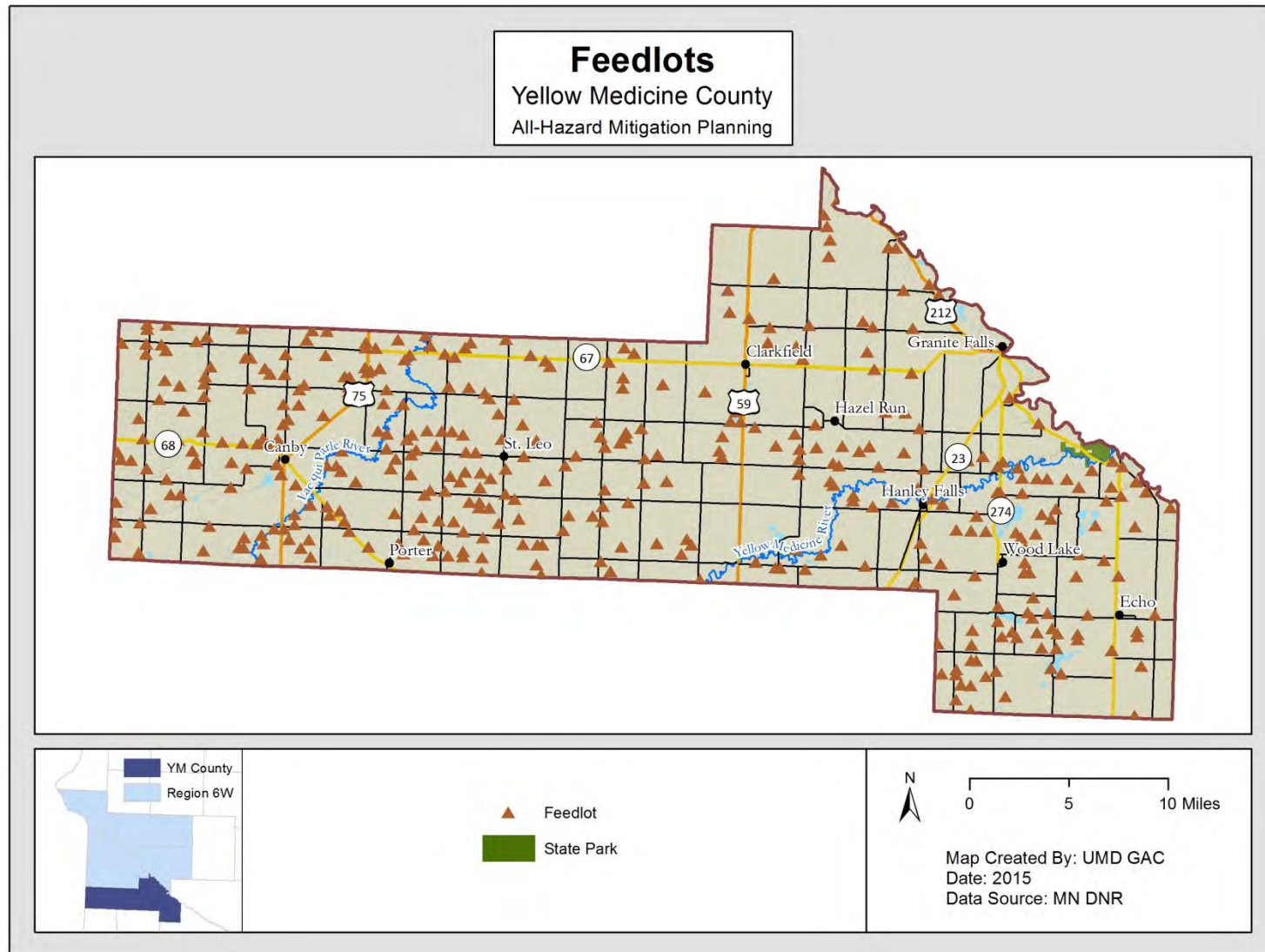


Figure A1.8 Yellow Medicine County Feedlot Locations



APPENDIX 2: CITY SPECIFIC GOALS, OBJECTIVES AND MITIGATION STRATEGIES

City of Canby: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Have safe and accessible safe rooms from violent storms.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Continue to address safe room needs in the county.	Identify and build a safe room for Canby campgrounds.	10-15 years	City	\$30,000	FEMA/ County	7	Citizen Safety

Goal 2: Improve severe storm warning system for all county residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Assess adequacy of existing civil defense sirens.	Purchase a backup power system for warning sirens.	5-10 years	City	\$5,000	NOAA	5	Citizen Safety

Goal 3: Provide emergency response to protect people in the event of a severe weather disaster.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Establish an emergency operations center that is equipped with necessary tools and provide a backup location to this center. These locations should have a backup power source.	Purchase a backup generator for city-wide use.	5-10 years	City	Unknown	FEMA/ USDA	3	Citizen Safety
	Purchase two backup generators for City Hall and Water Treatment Plant.	5-10 years	City	Unknown	FEMA/ USDA	4	Citizen Safety
	Install wiring and transfer switch to City Hall.	5-10 years	City	\$8,000	FEMA	6	Citizen Safety

Floods

Goal 2: Improve the safety and security of Granite Falls and other flood-prone areas.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Address flooding issues as a region.	Complete a City-wide Stormwater Project with 6 additional lines and refurbishing an existing stormwater line.	2 years	City	\$100,000	FEMA	2	Reduce Stormwater Runoff

Drought

Goal 1: Adopt a wellhead protection ordinance as proposed in the county Comprehensive Water Plan.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Coordinate with and encourage cities within the county to adopt complementing wellhead protection ordinances/plans.	Complete a city Wellhead Protection Plan.	1.5 years	City	Staff Time	--	1	Protection of Potable Water Sources

City of Clarkfield: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Have safe and accessible safe rooms from violent storms.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Encourage cities to adopt the universal building code.	Update Building Code Ordinance to newest version, cost for new books as required.	1 year	Building Inspector/ Administration	\$500	--	5	Citizen Safety
Encourage homes without basements to have a safe room where household residents may go in case of violent storms.	Educate residents about safe rooms, sirens, and encourage the use of weather radios. This could be accomplished in the City's Quarterly Newsletter and on the City Website.	1 year	City	\$500	FEMA	6	Citizen Education in Emergency Situations
Continue to address safe room needs in the county.	Identify specific needs and build safe room for Clarkfield Area Charter School.	2 years	City, CACS	\$150,000	FEMA	1	

Goal 2: Improve severe storm warning system for all county residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Assess the county's current warning system: how county is notified; who and how people and organizations within the county are notified.	Install a second siren in the City of Clarkfield located near to the Charter School so all residents in the city can hear the warning over the grain dryers.	1 year	City, County Emergency Manager		USDA	2	

Drought

Goal 1: Adopt a wellhead protection ordinance as proposed in the county Comprehensive Water Plan.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Coordinate with and encourage cities within the county to adopt complementing wellhead protection ordinances/plans.	Complete a city Wellhead Protection Plan.	1 –3 years	Water Department	Staff Time	City/ County	7	Protection of Potable Water Sources

City of Clarkfield: Goals, Objectives, and Mitigation Strategies (continued)

Water Supply Contamination

Goal 1: Protect residents from contaminated groundwater.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Provide adequate drinking water in the event of groundwater contamination.	Connect with Lincoln Pipestone Rural Water as a backup water option.	3-5 years	City of Clarkfield Water Department	Unknown	USDA – Rural Water	4	Create access to alternate potable water sources
	Build new city owned water treatment plant.	3-5 years	City of Clarkfield Water Department	Unknown	USDA – Rural Water	3	

Transportation

Goal 1: Protect passengers from traffic/train accidents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Install gates at the Highway 59 and Railroad intersection in Clarkfield.	Request the Minnesota DOT to install gates and/or flashing lights at the rail intersection in Clarkfield.	5-10 years	City	\$200,000	MnDOT	9	Citizen Safety
Increase pedestrian safety on transportation road network.	Continue to lobby efforts to rebuild Hwy 59 to include adequate shoulders on roadway.	Ongoing	City	Staff Time	--	10	Benefit City and Region and increase traffic safety with wider roads
	Construct sidewalks along Hwy 59 to connect school with the rest of the community.	2-5 years	City	Unknown	MnDOT	8	

City of Echo: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Have safe and accessible safe rooms from violent storms.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Educate residents of safe rooms in community. Encourage homes without basements to have a safe room where household residents may go in case of violent storms.	Purchase signage to mark weather shelter buildings and create an educational pamphlet to distribute to citizens.	2 years	City	\$25/sign	FEMA	6	Educate citizens on where to go and what to do in event of hazardous weather

Goal 2: Improve severe storm warning system for all county residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Assess adequacy of existing civil defense sirens.	Purchase a backup generator for existing weather siren.	2 years	City	\$5,000	FEMA	2	Ensure that Siren will work in event of power outage
	Purchase an additional weather siren for the East end of town.	1-3 years	City	\$15,000-\$20,000	USDA	5	Resident safety

Water Supply Contamination

Goal 1: Protect residents from contaminated groundwater.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Provide adequate drinking water in the event of groundwater contamination.	Make necessary updates and improvements to wastewater and drinking water systems.	2-5 years	City	Unknown	USDA	1	Ensure access to clean, safe water

All Hazards

Goal 1: Look at general ideas that serve the county/community through any disaster that may arise.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Ensure that homes are easily identifiable.	Ensure all residences within City limits have identifying addresses with visible street numbers.	1 year	City	\$5,000	--	3	Improve timeliness of Emergency Response Staff
Educate citizens on where to go and what to do in event of all hazardous weather events.	Draft an Emergency Operations Plan for fires, chemical spills, severe weather events, and gas leaks.	3-5 years	City, Fire Dept.	Staff Time	--	4	Educate citizens on where to go and what to do in event of hazardous weather

Violent Storms and Extreme Temperatures

Goal 1: Adopt a wellhead protection ordinance as proposed in the county Comprehensive Water Plan.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Educate residents of safe rooms in community.	Identify and map safe rooms and evacuation routes throughout the City.	2 years	Police Department	Staff Time	Police Department	7	Citizen Education

Flood

Goal 1: Eliminate nonconforming structures in the identified 100-year floodplain.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Eliminate nonconforming private and public structures in identified 100-year floodplains in Granite Falls.	Move the Granite Falls Fire Hall to a location outside the 100-year floodplain.	5 years	City	\$1,000,000	FEMA/ DNR	1	Prevent Flooding
	Relocate the 2 farmsteads near Dike Road in Stony Run Township.	5 years	City	Unknown	FEMA/ DNR	8	Prevent Flooding
Address the flooding issues of the Yellow Medicine County Museum in Granite Falls.	Relocate Yellow Medicine County Museum out of 100-year floodplain.	5 years	City	Unknown	FEMA/ DNR	2	Prevent Flooding

Goal 2: Improve the safety and security of Granite Falls and other flood-prone areas.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Protect the Sanitary Sewer Treatment Plant in Granite Falls from future flooding.	Relocate existing sanitary sewer lift station – In progress	1 years	City	\$2,370,000	FEMA/ DNR	6	Prevent Flooding
Prevent sanitary sewer line from becoming inundated with spring flooding.	Replace approximately 1,500 lineal feet of sanitary sewer on the west side of the Minnesota River, south of the river crossing.	5 years	City	\$401,000	FEMA	3	Prevent Flooding

Goal 3: Protect the structures that are repeatedly flooded.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Flood-proof repeatedly flooded buildings.	Flood proof the Hydro Plant in Granite Falls.	2 years	City	\$200,000	FEMA/ DNR	5	Prevent Flooding
	Flood proof the apartment building on Minnesota Avenue in Granite Falls.	2 years	City	\$50,000	FEMA/ DNR	4	Prevent Flooding

City of Hanley Falls: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Have safe and accessible safe rooms from violent storms.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Continue to address safe room needs in the county.	Determine a Community meeting place for shelter and how to get information out to residents including provision of emergency supplies.	1 year	City	Staff Time	--	4	Citizen Safety

Goal 2: Improve severe storm warning system for all county residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Assess adequacy of existing civil defense sirens.	Purchase back-up power supply for warning sirens.	5 years	Streets/Fire Depts.	\$10,000	NOAA	2	Ensure Warning Siren Will Operate

Goal 3: Provide emergency response to protect people in the event of a severe weather disaster.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Establish an emergency operations center that is equipped with necessary tools and provide a backup location to this center. These locations should also have a backup power source.	Purchase two transfer switches for West end lift station with generator and Fire Hall.	5 years	City	\$10,000	FEMA	3	Ensure Facilities Will Be Operable
	Purchase two 5,000 watt generators for City Office.	7 years	City	\$2,000	FEMA	5	Ensure Power in Emergency Situations

Flood

Goal 1: Improve the safety and security of Granite Falls and other flood-prone areas.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Address flooding issues as a region.	Purchase two 1,200 gallon/minute diesel portable pumps to handle rain/snow melt	3-5 years	City	Unknown	FEMA	1	Flood Event Likely to Occur

Drought

Goal 1: Adopt a wellhead protection ordinance as proposed in the county Comprehensive Water Plan.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Coordinate with and encourage cities within the county to adopt complementing wellhead protection ordinances/plans.	Complete a city Wellhead Protection Plan.	3-5 years	City	Staff Time	City/ County	7	Protect Potable Water Sources

City of Hanley Falls: Goals, Objectives, and Mitigation Strategies (continued)

Fire

Goal 1: Protect structures from fire.							
OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Ensure that Fire Departments have adequate equipment to fight fires.	Purchase a Grass Rig for Fire Department.	1-2 years	City	\$2,000 - \$3,000	FEMA	6	Increase Firefighting Capabilities

City of Hazel Run: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Improve severe storm warning for all residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Assess adequacy of existing civil defense sirens.	Purchase a backup generator for Emergency Weather Siren.	10 years	City	\$5,000	FEMA/USDA	5	Ensure Coverage for Entire Community

Drought

Goal 1: Adopt a wellhead protection ordinance as proposed in the county Comprehensive Water Plan.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Coordinate with and encourage cities within the county to adopt complementing wellhead protection ordinances/plans.	Participate and help implement the County Wellhead Protection Plan.	2 years	City	--	County	2	Protect Potable Water Supply

Water Supply Contamination

Goal 1: Protect the quality of the county's groundwater resources.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Minimize contamination of groundwater from unused or abandoned wells.	Work with County to cap abandoned wells in the City.	5 years	City	--	County	3	Protect Potable Water Supply

All Hazards

Goal 1: Look at general ideas that serve the county/community through any disaster that may arise.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Educate citizens on where to go and what to do in event of all hazardous weather events.	Create an Emergency Operations Plan that lists the order of command during an emergency.	2-3 years	City	Staff Time	--	4	Improve Emergency Response Time
Ensure that homes are easily identifiable.	Make all homes in Hazel Run easily identifiable by numbering all homes.	1 year	City	\$5,000	--	1	Citizen Safety

City of Porter: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Have safe and accessible safe rooms from violent storms.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Continue to address safe room needs in the county.	Purchase/build a safe room for community.	5 years	City	\$30,000	FEMA	6	Citizen Safety
Educate residents of safe rooms in community.	Identify and map safe rooms available to citizens.	5 years	City	\$500	--	7	Citizen Safety

Goal 2: Improve severe storm warning system for all county residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Assess adequacy of existing civil defense sirens.	Purchase a warning siren for city.	2 years	City	\$17,000	NOAA	3	Ensure Coverage for Entire Community
	Purchase a backup generator for Emergency Weather Siren.	2 years	City	\$5,000	FEMA	8	Ensure power in emergencies

Goal 3: Provide emergency response to protect people in the event of a severe weather disaster.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Establish an emergency operations center that is equipped with necessary tools and provide a backup location to the center. These locations should have a backup power source.	Install wiring, transfer switch, and generators to the Fire Hall.	10 years	City	\$30,000	--	5	Ensure Facility Will Be Operable During Hazardous Events
Ensure route into and out of town in the event of a disaster.	Build additional bridge across creek to have an alternative route heading east.	10 years	City	Unknown	Unknown	4	Ensure resident safety in the event of a disaster

Flood

Goal 1: Eliminate nonconforming structures in the identified 100-year floodplain.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Encourage cities to adopt Floodplain Ordinances if they have 100-year floodplains.	Draft and adopt a floodplain ordinance.	6 months	City	Staff Time	--	1	Prevent Flooding

City of Porter: Goals, Objectives, and Mitigation Strategies (continued)

Fire

Goal 1: Protect the quality of the county's groundwater resources.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Ensure that Fire Departments have adequate equipment to fight fires.	Purchase an all-terrain grass rig for Fire Department.	2 years	Fire Department	\$20,000	USDA/ FEMA	9	Improve Firefighting Capabilities

Hazardous Materials

Goal 1: Improve overall preparedness and equipment for handling hazardous events.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Adopt new technology to improve the county's ability to respond to a disaster.	Create Standard Operating Procedures for how to handle hazardous events.	1 year	City	Staff Time	--	3	Citizen Safety & Firefighter Preparedness

All Hazards

Goal 1: Look at general ideas that serve the county/community through any disaster that may arise.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Ensure that homes are easily identifiable.	Identify all homes in city limits.	1 year	City	--	--	2	Citizen Safety & Improve Fire Department Response Time

City of St. Leo: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Have safe and accessible safe rooms from violent storms.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Continue to address safe room needs in the county.	Create an Educational Pamphlet that contains information on where to go during a hazardous event and what supplies are necessary for an emergency kit. Send through utility billing mailing and post posters in high traffic area buildings.	2 years	City	\$500	FEMA	2	Citizen Education and Safety

Goal 2: Improve severe storm warning system for all county residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Assess adequacy of existing civil defense sirens.	Purchase a Weather Warning Siren.	15 years	City	\$17,000	NOAA	1	Ensure Coverage for Entire Community
	Purchase a backup generator for the weather sirens.	10 years	City	\$5,000	NOAA	3	Ensure Coverage for Entire Community

City of Wood Lake: Goals, Objectives, and Mitigation Strategies

Violent Storms and Extreme Temperatures

Goal 1: Improve sever storm warning system for all county residents.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reasoning for Rank
Assess adequacy of existing civil defense sirens.	Purchase a portable generator for Community Center.	1 year	City	\$1,000	USDA/ Rural Development	3	Citizen Safety
	Purchase a back-up power generator for weather warning sirens.	5 years	City	\$5,000	FEMA	2	Citizen Safety
	Purchase a Weather Warning Siren for East side of City.	5 years	City	\$17,000	NOAA	4	Ensure Coverage for Community

Drought

Goal 1: Adopt a wellhead protection ordinance as proposed in the county Comprehensive Water Plan.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Coordinate with and encourage cities within the county to adopt complementing wellhead protection ordinances/plans.	Draft and adopt a Wellhead Protection Ordinance.	5-10 years	City	Staff Time	--	5	Protect Potable Water Sources

Hazardous Materials

Goal 1: Improve overall preparedness and equipment for handling hazardous events.

OBJECTIVE	STRATEGIES	Time Frame	Responsible Entity	Estimated Cost	Funding Partner	Rank	Reason for Ranking
Adopt new technology to improve the county's ability to respond to a disaster.	Purchase sensor to detect ammonia leaks.	3 years	Equity Elevator/City	\$500	--	1	Citizen Safety

APPENDIX 3: SOLVED GAPS & DEFICIENCIES FOR HAZARDS

As noted in Chapter 3 Hazard Inventory for Yellow Medicine County, specific gaps and deficiencies were identified for all potential hazardous events. The problem areas identified in the original All-Hazard Mitigation Plan were presented to the Yellow Medicine Local Task Force and representatives from all cities within the county to state whether or not a gap or deficiency has been solved. In the event that efforts have been made to rectify a problem, but has not been fully completed, it remained under current gaps and deficiencies. Below is a list of all resolved gaps and deficiencies sorted according to hazard type.

Severe Storms:

- As many as 40 percent of the county's severe weather warning system sirens have not functioned properly at any given time. Also, a backup power source is not available for most of the county's sirens.
- The county's cities have emergency sirens to warn residents in the event of severe summer weather. Yellow Medicine County dispatch center has its own radar to track weather. The system is very old and does not function during a storm.
- While the county participates in the severe storm spotters network sponsored by the NWS, a procedure is not established for spotters when calling into local dispatch. Also, weather is extremely difficult to spot at night.
- Yellow Medicine County also has many "dead spots" around the county where emergency warnings from dispatch will not transmit. Three additional towers are needed to address this problem.
- Assessment of the risk of collapsed structure has not been assessed.
- The fairgrounds in Canby have not identified a safe place to go in the event of severe weather.
- The campgrounds in the city of Canby and at the Del Clarke campground have not identified a safe shelter to go to in the event of bad weather. If a potential farm museum is built at the Del Clarke site, a shelter should be part of the plans. It is not known if the campers at Del Clarke are able to hear the siren from Canby.
- While police radios currently work, it is uncertain what will happen after the state switches from UHF to VHF (800 MHz) in 2006-2007. The current radios will not work with the 800 MHz towers and new radios are extremely expensive. It is also not clear whether the new system will work in rural areas.
- There are schools and nursing homes in the county that do not have weather radios.

Extreme Temperatures:

- Emergency management personnel do not have an automated weather station. Having this system would greatly enhance the office's ability to react to severe weather.

Floods:

- The Granite Falls wastewater treatment plant is not in the 100-year flood zone but the lift plant is. Until moved, Granite Falls' water supply remains at risk.
- At-risk uses and structures remain in identified 100-year floodplains, including nonconforming structures and uses currently “grandfathered in” in both the county and Granite Falls land use plans and ordinances.
- Local resources are not adequate for a severe and prolonged flood and there is a need for assistance from outside the community during an emergency.
- Flood risks need to be evaluated for the floodplains of the Canby and Lazarus Creeks and the confluence of Spring Creek and the Yellow Medicine River.

Wildfire:

- The county has not undertaken a systematic assessment of wildfire risks and associated prevention measures.
- Land use regulations can provide some protection for rural housing. The DNR informally recommends considering reasonable structure setbacks (perhaps 200 feet) from permanent conservation lands (i.e., publicly owned, private lands with a permanent conservation easement, or lands owned by private non-profit conservation organizations such as the Nature Conservancy). An additional benefit of such setbacks would be a reduction in the potential conflict between hunting and residential land uses. In addition, standards for access roads and driveways in fire hazard areas could be considered in order to ensure safe passage of fire equipment.
- There are many CRP, CREP and other natural areas that are not managed with prescribed burns. These areas should be encouraged to work with professional agencies to manage the land with prescribed burns to help reduce trash and debris that can create a large wildfire hazard.
- All firefighters in Yellow Medicine County are volunteer firefighters. The DNR wildfire training offered to local fire departments should be offered closer to local fire departments to be more effective and efficient.
- Currently the DNR calls the county before lighting a prescribed burn. This information should come to the local dispatch in order to be better prepared for fires that get away or relight at a later time.
- Much of the land in wildfire risk is state land and in rural areas. It needs to be defined as to who is responsible for fighting these fires and to establish a mutual aid agreement between DNR and local fire departments.
- Infrastructure is important. Dry hydrants have been demonstrated as an effective tool in assuring a steady and close by source of water for responding to major both wild land and structural fires in rural areas. Assessment should be made to determine where existing dry hydrants are, where fire risks are greatest, and where water bodies suitable to support a dry hydrant are located. Suitable placement of additional dry hydrants may be difficult as the area to fight wildfires is extremely large.

- Communications between DNR and local fire departments needs to be more organized
 - A plan should be in place regarding proper radio channels between DNR, State Patrol, local fire departments and local police. The smoke associated with wildfires can present a major hazard on roadways. Without direct contact with law enforcement, traffic control can be compromised. A plan is currently in process to create an armor system.
 - Updated gear and a plan to use it in cooperation with other departments is necessary. The DNR should have an up-to-date list of equipment available to them in the event of wildfires.
- Because of the rough terrain and location of wildfires, many of the fire departments to not have adequate equipment to fight wildfires. Fire vehicle are not able to access these areas. More grass rigs and off-road vehicles are needed to address the problem of wild land and grass fires.

Infectious Diseases:

- The county has not adopted the Public Health Emergency Guide lines because it is not completed at this time.
- Guidelines for communication should be in place at the local level. Volunteer ambulance drivers or crew members helping with patients should be called immediately if an outbreak has occurred to keep them quarantined. Names and contact information should be collected at every emergency scene in order to keep any outbreak contained.

Structure Fire:

- Homes with chimneys pose a larger threat for fires. Specialized training classes, like chimney cleaning, safe cooking in the kitchen, and holiday hazards, could be offered to residents.
- Residents living in higher density areas should be more educated on fire prevention.
- Local Fire Departments do not have adequate equipment to fight fires; new trucks and PTE are needed in all Fire Departments.
- Local Fire Departments do not have adequate communication equipment to communicate with dispatch or other Fire Departments. Many of the Fire Departments are in need of new pagers to be alerted for fire calls.

Hazardous Materials:

- The county and the incorporated cities do not require that commercial/industrial establishments report hazardous materials to the county emergency center and to the respective cities' fire departments.

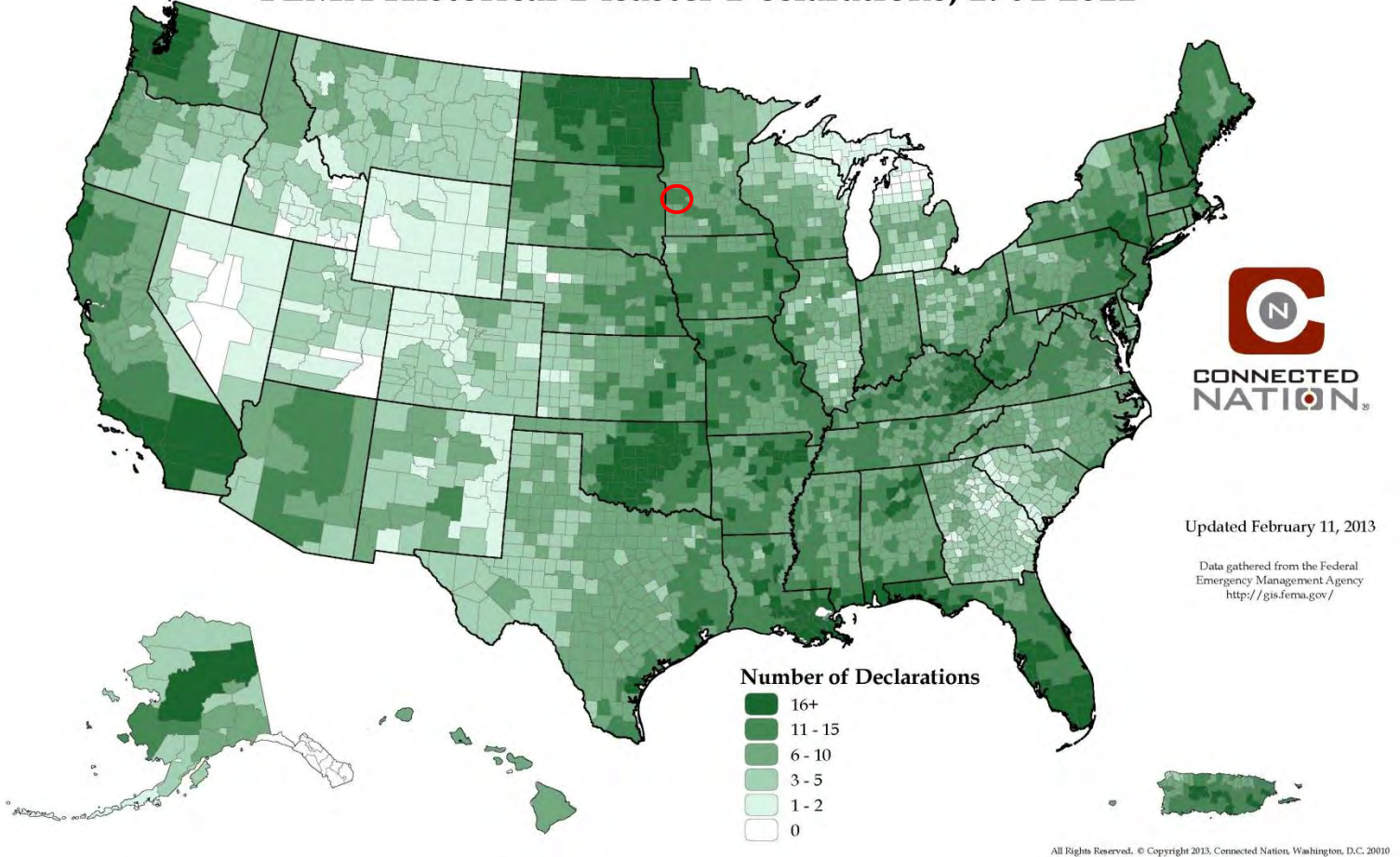
Water Supply Contamination:

- The emergency response plan does not identify alternate sources of drinking water, including locates for acquiring adequate amounts of bottled water, in the event of contamination.
- County officials' efforts to educate citizens with private wells are not well coordinated with state and federal efforts. Also, citizens are given very little encouragement to remove old wells that are not compliant with the 1974 standards.
- The Burr Treatment plant should be more secure.
- Need installation of devices to stop contamination from individual homes into the water.

Civil Disturbance/Terrorism:

- School emergencies should be addressed and drills practiced.

FEMA Historical Disaster Declarations, 1964-2011

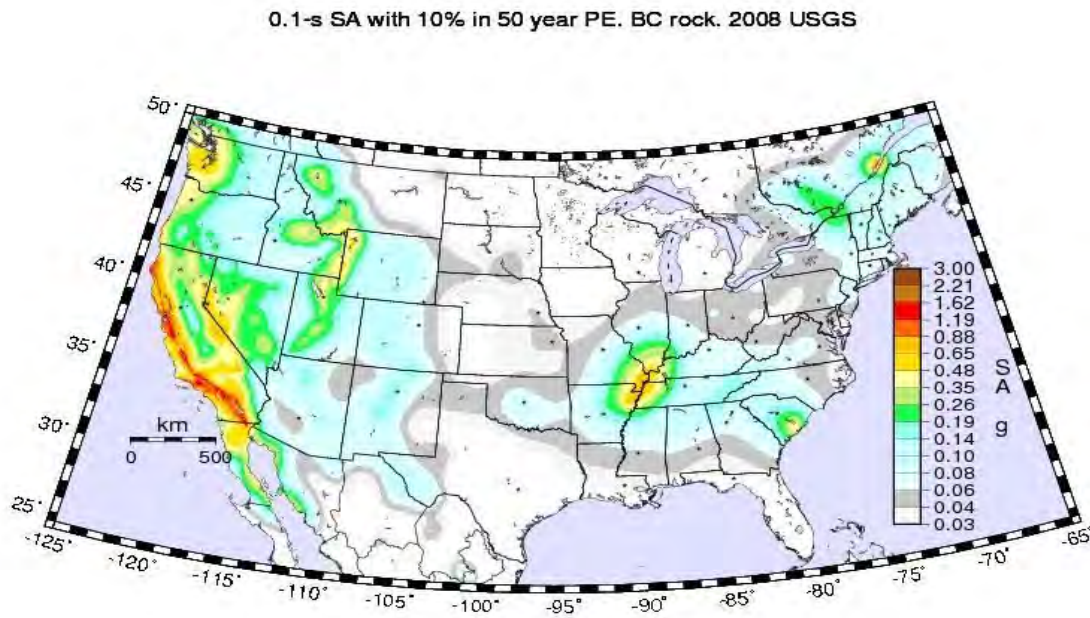


Presidential Disaster Declarations: 1964-2011

From 1964 to 2011, Yellow Medicine County has witnessed 11-15 Presidential Declarations (see red circle). From 2000 to 2011, Yellow Medicine County has experienced seven Presidential Disaster Declarations: 2001 (Flood), 2006 (Winter Storm), 2009 (Flood), 2010 (Spring Flood), 2010 (Fall Flood), 2011 (Flood), and 2011 (Summer Storms). There was another flood declaration during the summer months of 2014.

Image Source: <http://www.connectednation.org/publicsafety>

Earthquakes

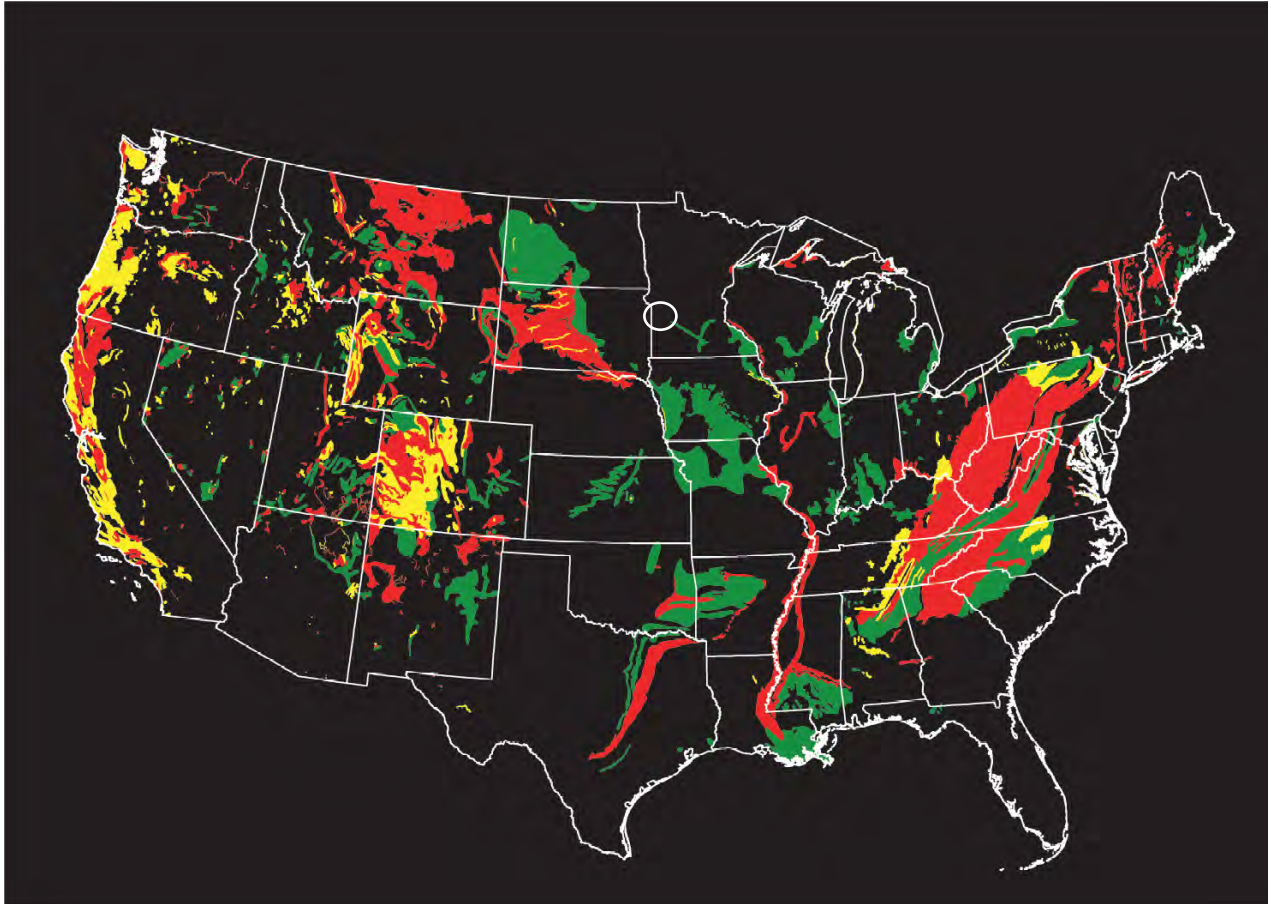


This map identifies the Probability of Exceedance for the United States at 10% in 50 years. The map measures probabilistic ground motion. Because all 5 counties in our region are below 3% g, these counties have a relatively low seismic risk and will not conduct an earthquake risk assessment.

Image Source:

<http://earthquake.usgs.gov/hazards/products/conterminous/2008/maps/us/10hzSA.10in50.usa.jpg>

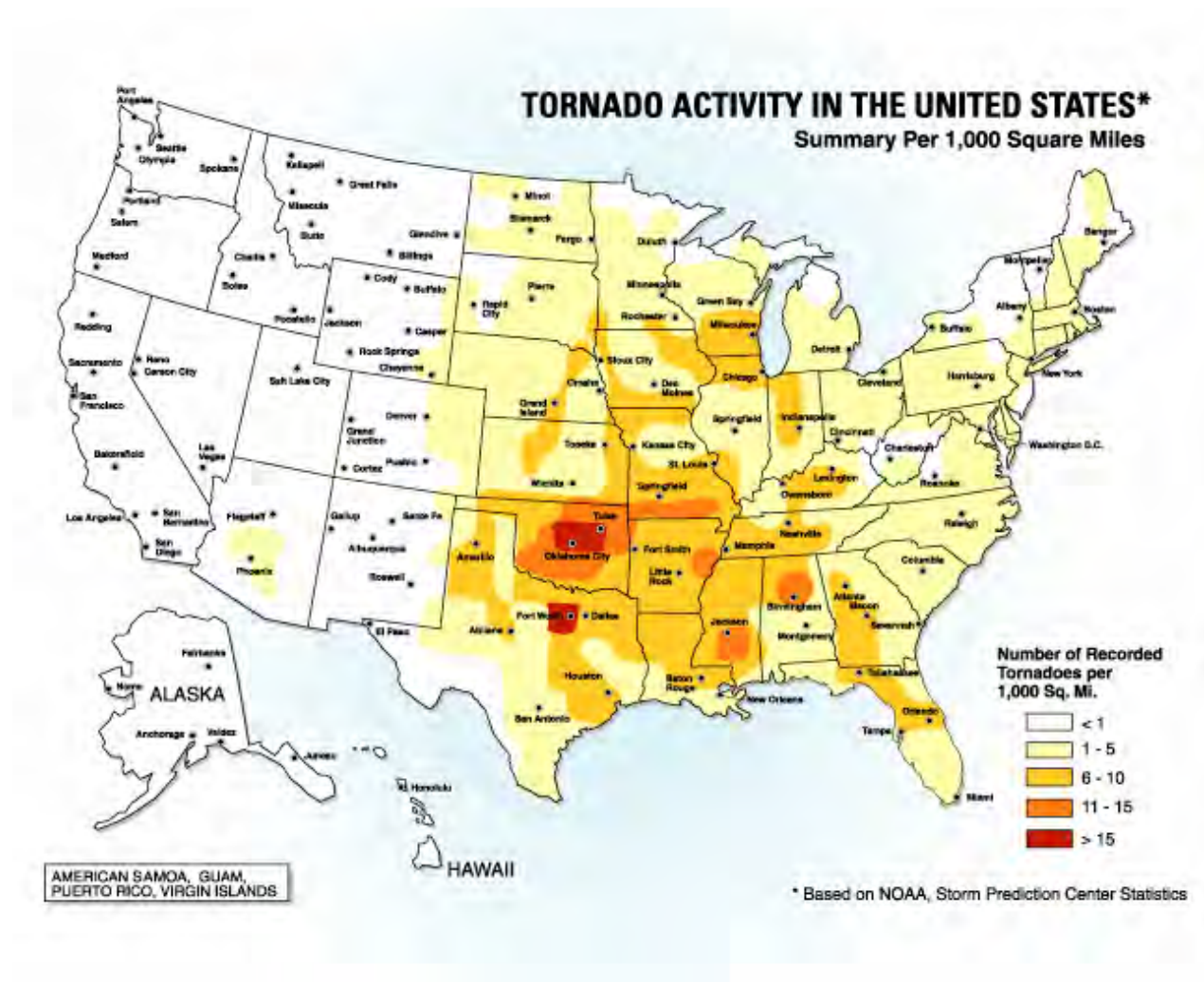
Landslides



There is very low susceptibility for landslides in Yellow Medicine County.

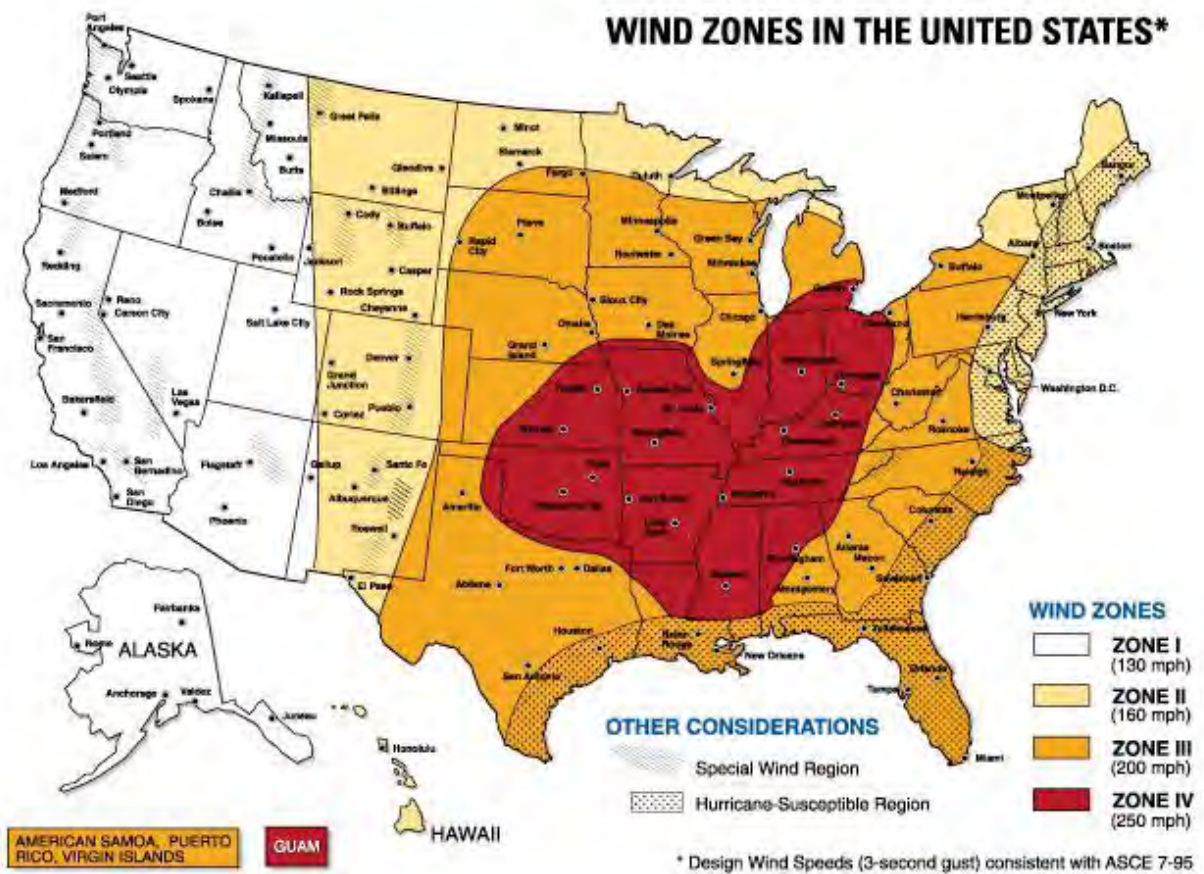
Image Source: <http://pubs.usgs.gov/fs/2005/3156/2005-3156.pdf>

Tornados



Tornados in Yellow Medicine County fall in the range of 1-5 tornados every 1,000 miles and are within Wind Zone Three (200mph). The combination of these effect put Yellow Medicine County at a “High Risk” for a tornado.

Image Source: <http://www.fema.gov/pdf/library/ism2.pdf>



Yellow Medicine County is located in Wind Zone III (potential for 3-second gusts up to 200 mph). Straight line winds have been an increasing issue in the county causing sizable property damage.

Image Source: <http://www.fema.gov/pdf/library/ism2.pdf>

APPENDIX 6: CLIMATIC CONDITIONS FOR THE 2001 FLOOD EVENT

Spring Flooding of 1997

Contributing Climatic Conditions

1. Heavy autumn precipitation

- much of Minnesota **six or more** inches in late October and November of 1996
- many areas **four or more** inches **above** normal
- most of Minnesota in **95th percentile** (one in 20 year event)

2. Extraordinary winter snowfall

- much of Red River and Upper Minnesota River Basins over six feet of snowfall
- some areas over eight feet of snowfall
- many areas two to three times average snowfall
- over 40 percent of Red River Basin (Minnesota portion) and uppermost reaches of Minnesota basin in 99th percentile (near or exceeding record snowfall)
- two thirds of Red River reach in 99th percentile
- historically no greater area of Red River Basin in record snowfall category in any past season
- 1996-97 snowfall exceeded 1896-97 (severe Red River flooding a century ago) snowfall by 25 to 50 percent in much of Red River Basin (Minnesota portion)
- less than 10 percent of basin covered by record snowfall in 1896-97
- discussions of earlier Red River flooding are available below

3. Less than ideal snowmelt scenario

- few mid and late winter melting days

- large temperature fluctuations in early April
- up to 10 degrees above normal in first week of month
- up to 20 degrees below normal in second week of month

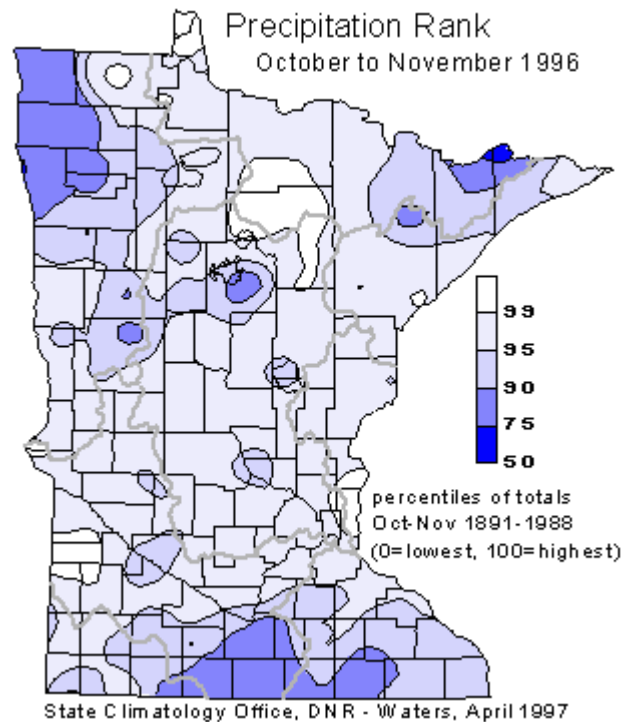
4. Heavy early spring precipitation

- two or more inches of precipitation (rain and snow) in western Minnesota April 5-6, 1997
- normal monthly April precipitation approximately two inches for region

FALL/WINTER OF 1996-97

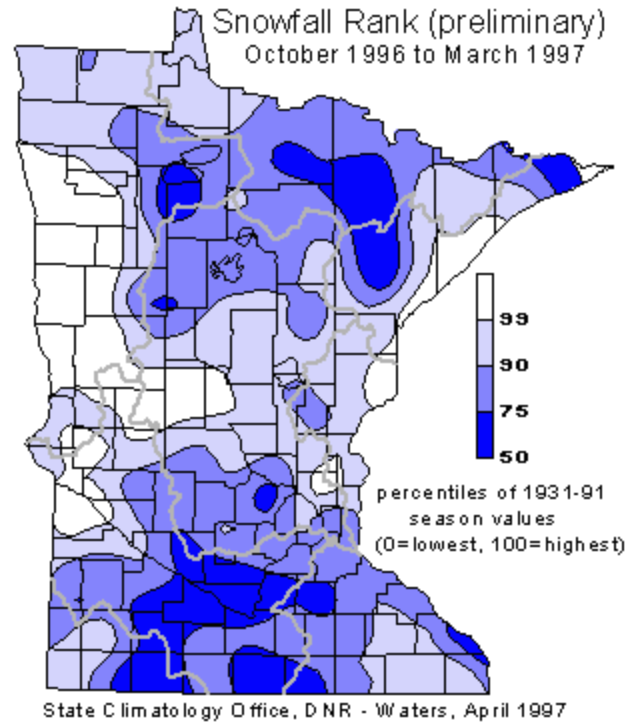
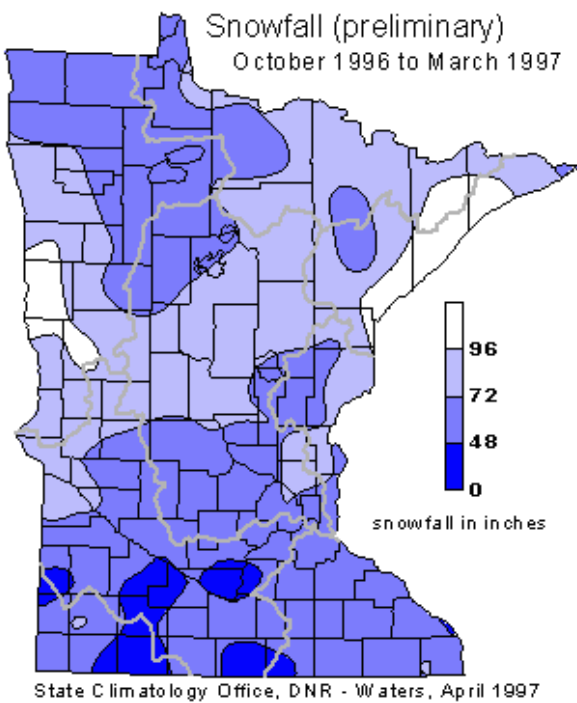
1. Heavy autumn precipitation

Much of Minnesota received **six or more** inches of precipitation in late October and November, 1996. For many areas such amounts were **four or more inches above** normal. Over most of Minnesota, such amounts ranked above the **95th percentile**, that is a one in 20 year event.



2. Extra Ordinary winter snowfall

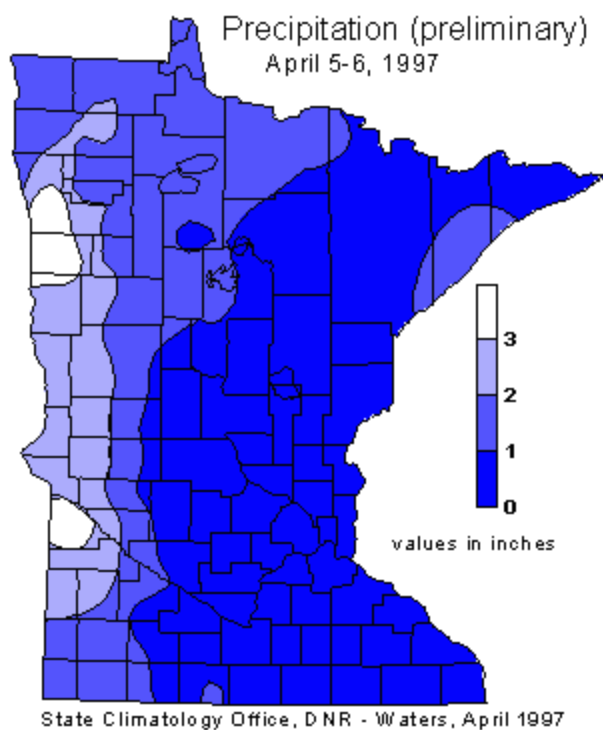
Over the course of the 1996-97 winter, much of Red River and Upper Minnesota River Basins, and the north shore of Lake Superior received over **six feet** of snowfall. Some areas ended up with over **eight feet**. Those amounts were as much as **two to three times average** snowfall. At Fargo, for instance, 117.0 inches fell in the 1996-97 season which may be compared with their long-term average snowfall of 38.9 inches and their old seasonal record of 89.1 inches.



The snowfall map shows that the heaviest snows extended eastward from the Fargo area to the north shore of Lake Superior. In much of the Red River Valley, the upper reaches of the Minnesota River, and along the north shore, those snowfalls were **very near or above the record** conditions in the 60 seasons from 1931 to 1991 (that is, the areas that ranked 99th percentile or greater).

3. Heavy early spring precipitation

At the beginning of the melt period, on April 5-6, 1997, **two or more** inches of precipitation (rain and snow) occurred in western Minnesota. At Crookston, 3.63 inches fell in two days. In a 100-year record there, the largest two-day total for March or April had been 2.35 inches. Normal **monthly** April precipitation is approximately two inches for the region.



4. Less than ideal snowmelt scenario

This season few mid and late winter melting days occurred. Large temperature fluctuations occurred in early April. Temperatures were up to **10 degrees above normal** in the first week of the month followed by up to **20 degrees below normal** in the second week of the month.

APPENDIX 6: CLIMATIC CONDITIONS FOR THE 2001 FLOOD EVENT

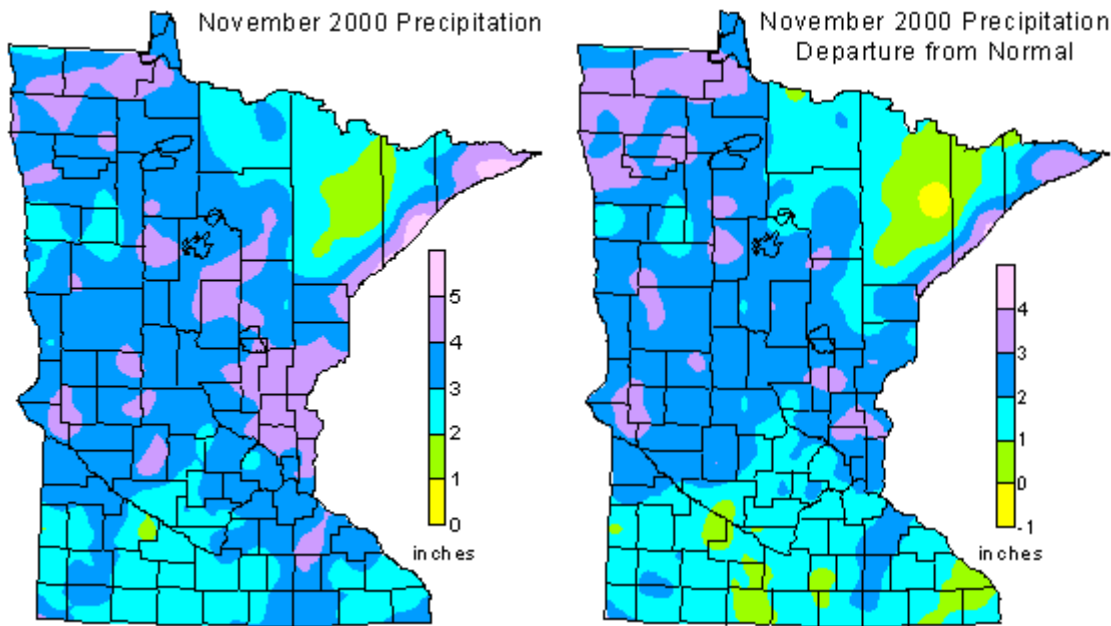
Climatic Conditions Leading to the Spring Flooding of 2001

Major flooding occurred along many of Minnesota's rivers during April 2001. The flooding was caused by four contributing climatic factors:

- **significant autumn precipitation**
- **heavy winter snowfall**
- **less than ideal snowmelt scenario**
- **record-breaking April precipitation**

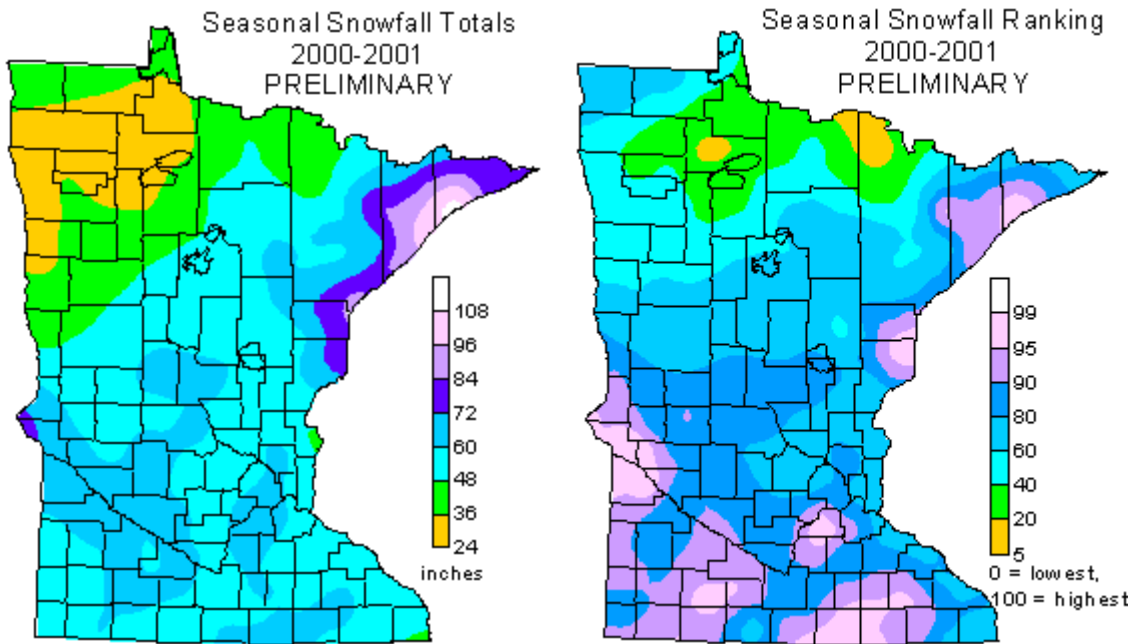
1) Significant Autumn Precipitation

Many southwestern, central, and east central Minnesota locations entered November with water deficits due to below normal growing season rainfall. However, heavy early November rains filled the upper portions of the soil profile before soil freeze-up. The figures below show that November 2000 precipitation exceeded the historical average by more than two inches in many locations.



2) Heavy Winter Snowfall (2000-2001)

Mid- and late-November snows blanketed much of the state with a lasting snow cover that was to persist into the early spring. The figure below shows that seasonal snowfall totals exceeding 60 inches were common throughout western and southern Minnesota. Snowfall totals in excess of 72 inches were reported in northeastern Minnesota. As seen below, snowfall totals in 2000-2001 ranked above the 80th percentile across much of southern, western, and northeastern Minnesota. In some communities, seasonal snowfall exceeded the 95th percentile. Normal annual snowfall in the southern one half of Minnesota ranges from 36 inches in the west to around 50 inches in the east. 2000-2001 snowfall topped the historical average by approximately two feet in western Minnesota, and by more than 18 inches in most southern Minnesota counties. Snow water equivalent in the snow pack at the end of the season was three to five inches in many areas. While 2000-2001 snowfall was heavy in many communities, the snowfall totals were far less than the 72 to 96 inch totals that covered most of the Red River basin and much of the Upper Minnesota River Basin in [1997](#).

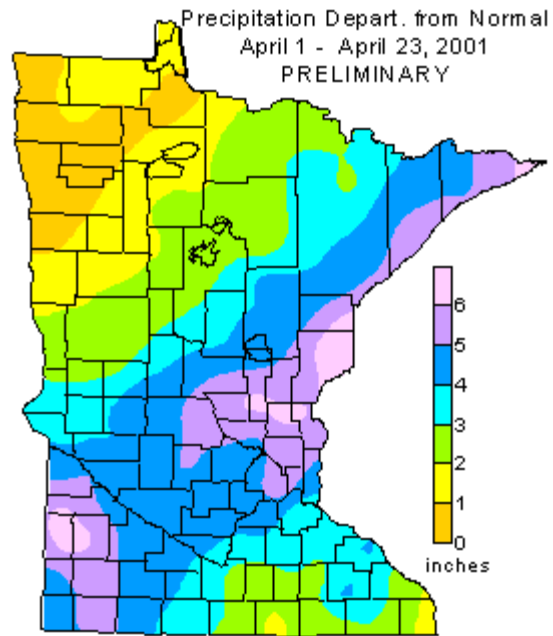
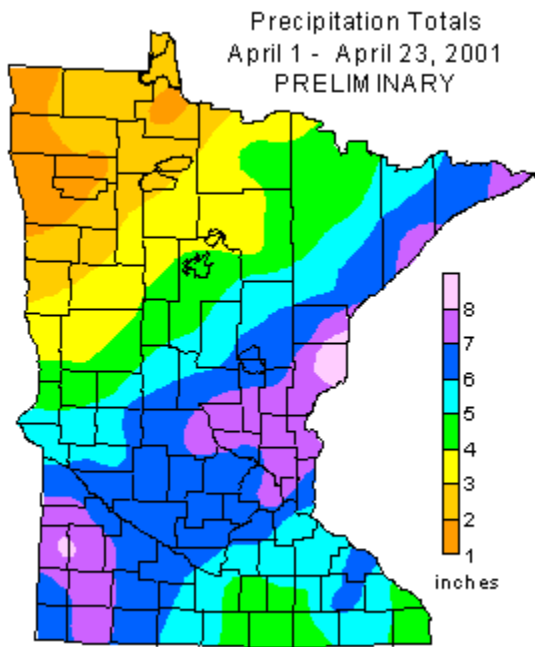


3) Less Than Ideal Snowmelt Scenario

The winter of 2000-2001 provided very few mid and late-winter melting days. While January was relatively mild, temperatures were still cold enough to retain most of the snow cover established during November and December. February was quite cold, finishing four to eight degrees below normal. March temperatures were three degrees below normal. The snow pack gradually diminished in depth throughout March, nevertheless snow water content did not change appreciably. Much of the melt water stayed on the landscape in the micro-relief.

4) Record-breaking April Precipitation

Extraordinarily heavy precipitation fell across much of Minnesota in April 2001. The figure below shows that a broad swath of southwestern, central, east central, and northeastern Minnesota received over six inches of precipitation from April 1 to April 23, 2001. Precipitation totals surpassed the historical average by more than four inches in these areas. For many communities, all-time April monthly precipitation records were set before the month came to a close.



[Return to the Climate Journal](#)

mcwg@soils.umn.edu

URL: http://climate.umn.edu/doc/flood_2001/flood_2001.htm

Last modified: April 24, 2001

APPENDIX 7: ADDITIONAL INFORMATION ON 1997 AND 2001 FLOOD EVENTS

Countywide Issues:

- Roads damaged from hauling of sand, etc.
- Flooded county and township roads, bridges and culverts.
- Flooded county ditches.
- High groundwater all over.
- Flooding all over county – streams, creeks and wetlands as well as major rivers and lakes.
- Many roads closed.
- Lives at risk, especially in 1997.
- In 1997 only, septic tanks backed up into homes (many rural septic systems have been updated since).
- In Yellow Medicine County, there are large floodplains associated with the confluence of Canby and Lazarus Creeks, and the confluence of Spring Creek and the Yellow Medicine River.
- Rural flooding is also an issue of concern. Rural flooding can impact structures as well as agricultural lands. Flooding of township roads cause enormous amounts of damage, but generally go unnoticed by the public.
- Lost many machine sheds.
- Saturated soils.

Issues in Granite Falls:

- 1997 record flood (23.9 feet).
- Dangerous for volunteers filling hundreds of thousands of sandbags and building sandbag levees around homes and businesses in both 1997 and 2001.
- Residential property damaged and people were forced to evacuate their homes.
- A sanitary lift station on the south side of MN Avenue was in jeopardy of undermining in both 1997 and 2001. Dangerous sandbagging by volunteers protected the lift station.
- In 1997, treated water from the water treatment plant is stored in “clear wells”. These clear wells are located in the floodplain and it was unclear if the water was contaminated. The city had to ask everyone to boil their water and hauled in truckloads of bottled water for the residents.
- Electrical lines were undersized and the power pull platform was threatened by floodwaters and undermining in the 1997 floods. This would have affected power service to 2/3 of the city.
- A water line that crossed the river was broken up by debris and floodwaters.
- Eight single-family homes were lost and two apartments were lost displacing 20 families in 1997. No homes were lost in 2001.
- One business was lost in 1997 flood.
- Many homes along MN Avenue, 15th Avenue and throughout the city sustained damaged from floodwaters in 1997 and 2001.
- The integrity of the levee was a concern throughout the flooding of 1997 and 2001.
- Internal drainage was a problem for areas of the city in 1997.
- The Yellow Medicine County Museum flooded in both 1997 and 2001. The contents had to be removed and the building was damaged.

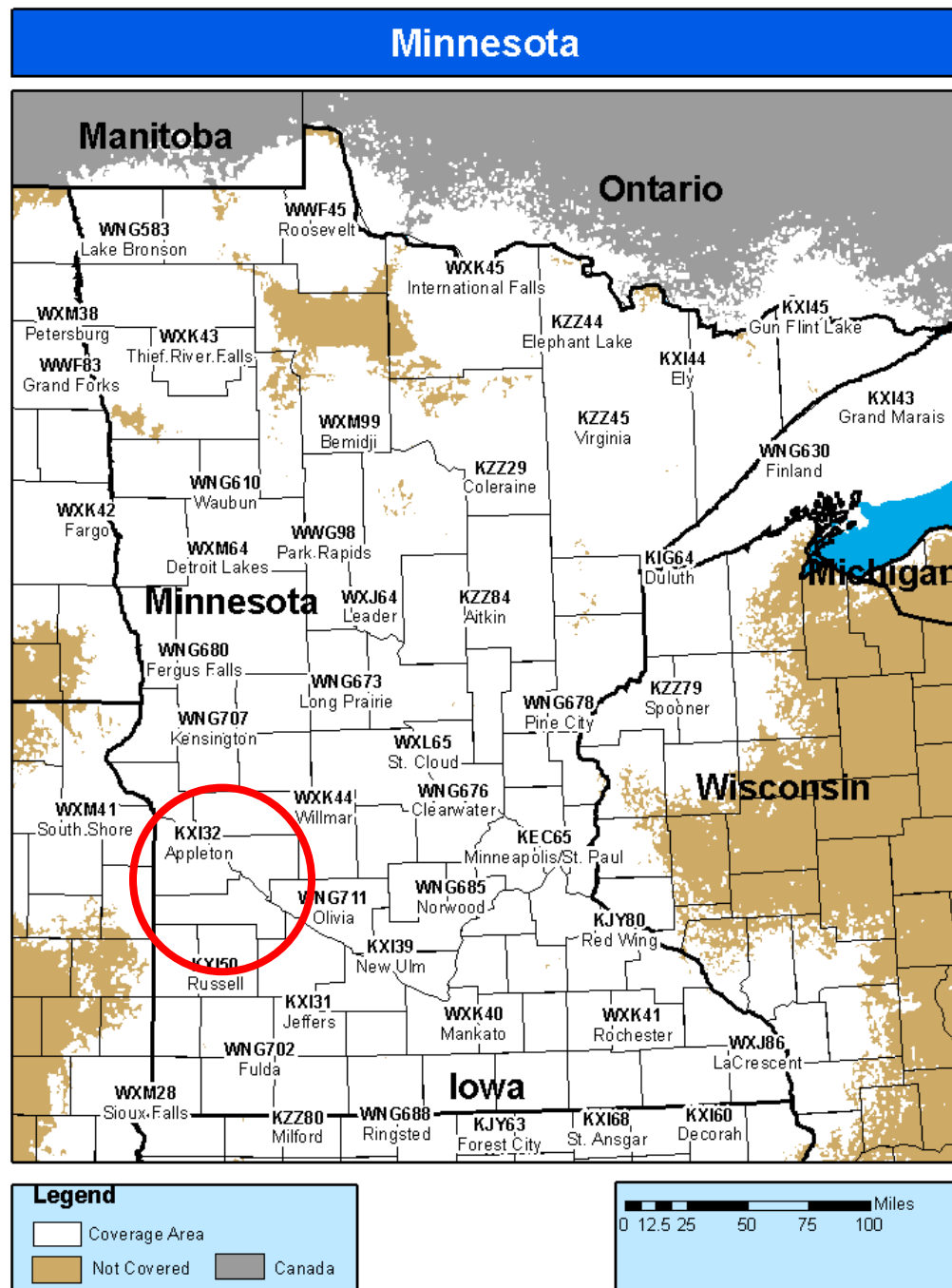
Changes Made:

- Utilities crossing the river were moved or rebuilt to withstand future high water.
- Utilities behind Main Street were buried and covered with concrete.
- The water line and sanitary sewer line that crossed the river was raised and replaced.
- Twenty-eight homes removed from floodplain.
- One business was removed from floodplain.
- Concrete walls were built around clear wells to protect the treated water, preventing contamination in 2001.
- Transformer was moved and put onto larger posts and distribution lines were increased, preventing future threats to the electrical lines.
- Temporary pumping stations were used in 2001 to equalize the storm sewer pressure with the floodwaters. This mitigated the internal drainage problem.

Future Concerns:

- After mitigation is complete, no homes will remain in the current floodplain. If the floodplain changes after FEMA reevaluates the floodplain, homes to the south of city hall on Prentice Street may be located in the floodplain.
- The homes along Prentice Street do not have a levee footprint to provide and accessible and prepared foundation for future flood fighting efforts.
- Main street businesses remain in floodplain; however, they will be flood-proofed and should be able to withstand floodwaters.
- Need to consider that there is less chance that future floods will cause a “disaster designation” and some entities will not receive the help needed.
- The temporary pumping stations to equalize pressure are less reliable than permanent pumping stations.
- The levee’s integrity is questioned.
- The water treatment plant is very close to the floodplain.
- Sanitary sewer line needs replacement. Infiltration occurs annually due to spring flooding.
- The lift station at the south end of MN Avenue will continue to be in jeopardy in future flood events.
- The removal of the county museum is an issue that needs addressing in the future. The museums operational expenses are shared with the county and city of Granite Falls. The museum is located on the river front edge. In both floods, the museum experienced damage. It has been recommended by DNR and FEMA that this facility be relocated.
- The Granite Falls Fire Hall is located down town and on the river front edge. During both floods the hall had water in the cooling and heating system because of the rise in the ground water at that location. In the future moving the fire hall out the flood area should be considered.

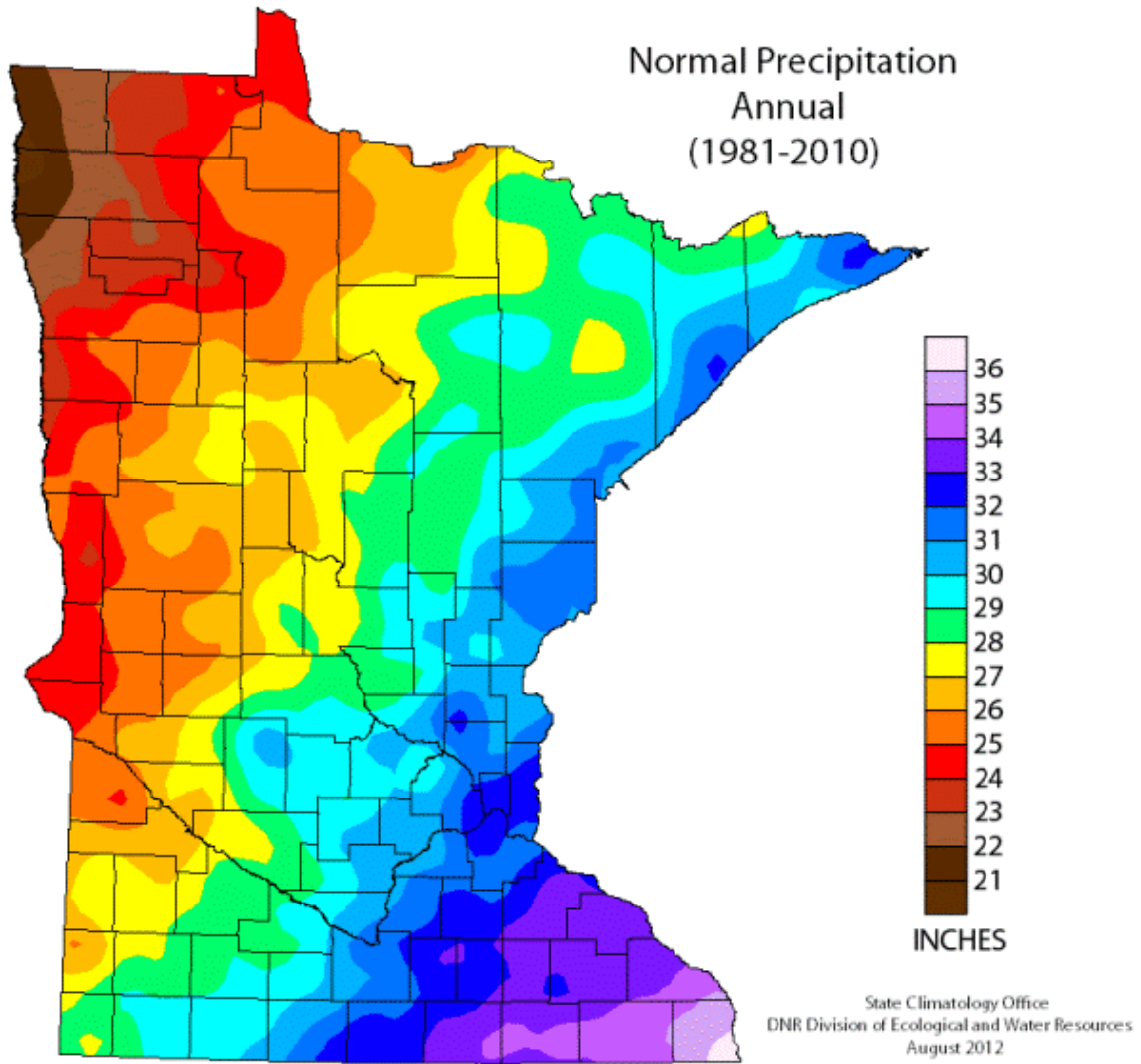
Minnesota Weather Radio Broadcast Coverage (2010)



Yellow Medicine County is covered by Appleton KX132.

Image Source: <http://www.nws.noaa.gov/nwr/Maps/PHP/MN.php>

APPENDIX 9: NORMAL ANNUAL PRECIPITATION



A majority of Yellow Medicine County normally receives 26 to 27 inches of precipitation annually. Along the northern border, in the center of the county, the normal annual precipitation is between 25 and 26 inches. The southeast corner of the county normally receives between 27 and 28 inches of precipitation annually.

Image Source: http://www.dnr.state.mn.us/climate/summaries_and_publications/precip_norm_1981-2010_annual.html

APPENDIX 11: EXAMPLE CITY SURVEY

City Land Use

City: _____

Date of last Land Use Survey: _____

Land Use	Parcels	Acres	Percent
Agriculture			
Residential			
Commercial			
Industrial			
Public Institutions			
Religious/Non-Profit			
Parks			
General Open Space			
Water			
Floodplain			
Other _____			

City Risk Assessment Survey – Part 1

City: _____

Most Recent Population Count: _____ as of _____

1. Have any hazardous events occurred in your city since 2010? Include date, specific event data, affected areas, amount of loss, etc.	
2. Are there new hazards in your community?	
3. Are there any vulnerable structures in: hazard areas, redeveloped areas, or recently annexed areas?	
4. In proposed annexation areas, are there or will there be more structures in hazard areas?	
5. How much land has been annexed in the past 10 years? What are the new land uses of the newly annexed land?	
6. Have any new buildings for high-risk populations been constructed in your city?	
7. What actions (if any) have been taken to reduce the vulnerability of these high-risk populations?	
8. What general types of development are located in 100 and 500 year floodplains?	100: 500:
9. What are future development opportunities in the 100 and 500 year floodplains?	100: 500:

10. Based on the City Comprehensive Plan (if applicable), what areas have been identified for future growth?	
11. Are there any unique natural features, natural areas, or other environmental and aesthetic attributes present in the floodplains?	
12. Have land uses for the parcels in your city changed since 2010? If so, which ones and to what?	
13. Does your city have an up-to-date zoning map? Is there an electronic version?	
14. Have there been any new city facilities built in your city since 2010?	
15. Have any new telecommunication and/or power facilities been built in your city since 2010?	
16. Have there been any new hospitals/clinics built in your city since 2010?	
17. How many ambulances (if any) does your city currently have?	
18. Fire Department Numbers	Firemen ____ Pumpers ____ Tankers ____ Grass Rig/Truck ____ Aerial/Ladders ____ Air Packs ____
19. Law Enforcement Numbers	Full-Time Officers ____ Part-Time Officers ____ Squad Cars ____

Mitigation Strategies and Objectives

City: _____

<p>1. What mitigation strategies have your City completed since 2010?</p>	
<p>2. What mitigation objectives has your City worked toward since 2010?</p>	
<p>3. Would you make any changes to the previous Hazard Mitigation Plan: Goals/Objectives/Strategies?</p>	

Inventory of Community Assets

City: _____

Date of Value Assessment: _____

Please list all community assets in your city, including the building size, replacement value, and the value of its contents and its function.

Name of Asset	Building Size (Sq.Ft)	Replacement Value (\$)	Content Value (\$)	Function Value (\$)
Major Employers				
Business Districts				
Industrial Businesses				
Multi-Family Housing				
Historical Structures				
Institutional Buildings				
Schools				

APPENDIX 10: INVENTORY OF HAZARDOUS MATERIAL SPILLS

Spill Date	Spill Name	City	Spilled Product	Quantity Released	Initially Reported Source Of Spill
Unknown	Farmers Union Oil - auto line test	Granite Falls	Unknown	Unknown	UST Including Dispenser + Hose
7/30/2002	Minnesota West Comm. & Tech. College	Canby	Light Fuel Oil and Diesel	200 Gallons	UST Including Dispenser + Hose
9/4/2003	MN Valley Substation	Granite Falls	Mineral Oil	1 Gallon	Transformers
9/25/2003	Becker's Trucking Inc. at Wegdahl corner	Granite Falls	Food	6,000 Gallons	Truck/Vehicle Cargo
10/29/2003	Sub station	Granite Falls	Mineral Oil	50 Gallons	Transformers
11/7/2003	Cargill-Gluek	Granite Falls	Light Fuel Oil and Diesel	50 Gallons	Truck/Vehicle Fuel
1/28/2004	Minnesota Valley Generating Plant	Granite Falls	Sewage Or Wastewater	700 Gallons	Hose Or Pipe, Not Tank Related
6/15/2004	Xcel Energy	Wood Lake	Mineral Oil	10 Gallons	Transformers
11/4/2004	Kane Transport	Canby	Asphalt	6,000 Gallons	Truck/Vehicle Cargo
4/6/2005	Richard Schultz Trucking, Inc	Echo	Light Fuel Oil and Diesel	75 Gallons	Truck/Vehicle Fuel
4/26/2005	Prairie Grain Partners	Clarkfield	Pesticide	15 Gallons	Truck/Vehicle Cargo
8/1/2005	Dwayne Erickson farm field	Wood Lake	Manure	Unknown	Truck/Vehicle Cargo
8/18/2005	Harvest Land Coop, Traffic Accident	Echo	Hydraulic Fluid	50 Gallons	Hose Or Pipe, Not Tank Related

10/20/2005	MNDOT, Shoulder of roadway, Hwy 212	Montevideo	Other (Described In Remarks)	5 Gallons	Barrels/Containers
10/27/2005	Scenic Overlook, Hwy 212 - 23	Granite Falls	Paint	5 Gallons	Barrels/Containers
2/17/2006	Prairie Grain Partners	Clarkfield	Fertilizer Not Anhyd. Ammonia	5,000 Gallons	AST - Within Containment Area
3/11/2006	Waltz Septic Service, Dumping complaint	Canby	Sewage Or Wastewater	3,000 Gallons	Truck/Vehicle Cargo
10/6/2006	Kerkert Pumping - manure spill	Clarkfield	Manure	9,500 Gallons	Truck/Vehicle Cargo
12/10/2006	Yellow Freight terminal, diesel spill	Granite Falls	Light Fuel Oil and Diesel	Unknown	Truck/Vehicle Fuel
4/29/2007	Equity Elevator Trading Company	Granite Falls	Fertilizer Anhyd. Ammonia	Unknown	Truck/Vehicle Cargo
9/13/2007	Novco Inc. saddle tank	Granite Falls	Light Fuel Oil and Diesel	100 Gallons	Truck/Vehicle Fuel
11/27/2007	Otter Tail Power Company, transformer oil release	Canby	Mineral Oil	10 Gallons	Transformers
1/26/2008	Herman Kockelman	St. Leo	Light Fuel Oil and Diesel	30 Gallons	AST Including Lines
2/7/2008	Specsys company	Granite Falls	Acid/Base Chemicals	1 Quart	Other
4/2/2009	Specialty Systems- hydraulic fluid from hose	Granite Falls	Hydraulic Fluid	10 Gallons	Hose Or Pipe, Not Tank Related

6/1/2009	Residential complaint-transformer oil-Khali Residence	Granite Falls	Mineral Oil	Unknown	Transformers
7/8/2009	Particulate complaint from hotmix plant	Granite Falls	Other (Described In Remarks)	Unknown	Other
6/23/2010	450th Street	Near Clarkfield	Diesel	Unknown	
11/20/2010	Northern Natural Gas	Echo	50/50 Ethylene Glycol	21 Gallons	
5/9/2011	Unknown	Near Clarkfield	Tripleflex Herbicide	15 gallons	
7/3/2011	140th Ave (1)	Echo	transformer oil	10 gallons	Transformers
7/4/2011	140th Ave (2)	Echo	transformer oil	15 gallons	Transformers
10/10/2011	Minnesota Valley Generating Plant	Granite Falls	Fuel Oil	Unknown	
2/16/2012	Hwy 23	Near Hanley Falls	Diesel	Unknown	Possible Saddle Tank
4/20/2012	Energy Serve Tank	Granite Falls	Syrup	130 gallons	
4/24/2015	Hwy 59	Clarkfield	Tripleflex Herbicide	1200 gallons solution/17 gallons herbicide	
5/1/2012	Brunner Site	Granite Falls	1034/0	up to 400 gallons	
5/30/2012	Farmers Coop	Canby	Petroleum E85	1300 gallons	
7/9/2012	110th Ave	Echo	Power Max	200 gallons	
8/14/2012	Hwy 59 & 18	Hanley Falls	Barrage and Fuel	120-150 gallons	
6/25/2013	MN Valley Substation	Granite Falls	transformer oil	10 gallons	Transformers
1/3/2014	Granite Falls Energy	Granite Falls	Corn Syrup/30% solids	600 gallons	
6/4/2014	Hazel Creek Substations	Granite Falls	Mineral Oil	25 gallons	Transformers

APPENDIX 12: PUBLIC PARTICIPATION

Yellow Medicine County All-Hazard Mitigation Plan Task Force Meeting #1: Hazard Identification

July 31st, 2014

7:00 pm

YMC Courthouse Conference Room
Granite Falls, MN

Agenda

- 7:00 Task Force Introductions**
- 7:05 Overview of Planning Process**
 - Hazard Mitigation: Purpose and Plan
 - Timeline for Project
 - Public Participation
- 7:20 Hazard Identification**
 - Historical Hazards
 - Gaps and Deficiencies
 - New Hazards
- 8:15 Questions and Next Meeting: Risk Assessment**
- 8:20 Brief Meeting with City Representatives**

FOR IMMEDIATE RELEASE

All-Hazard Mitigation Planning to Help Create Safe, Sustainable Communities

Yellow Medicine County, MN – Floods, earthquakes, and tornadoes are all functions of the natural environment and become hazardous when they threaten our built environment with destruction. Each year billions of dollars are spent by federal, state, and local governments, not to mention individuals, in response to and recovery from natural disasters. Lives are lost or devastated; property is demolished or devalued; the economic viability of communities is impacted for years to come.

Many techniques have proven effective in reducing or eliminating long-term effects of natural disasters. Such mitigation techniques, when undertaken before the next flood, earthquake or tornado, can lessen the likelihood that a natural hazard will become a disaster. It is important that community planning incorporates hazard mitigation to make a community a safer place to live and work and a more sustainable environment for generations to come.

As a result of the Disaster Mitigation Act of 2000, FEMA required that in order to be eligible for Hazard Mitigation Grant Program (HMGP) funds, a local unit of government (county, city, township) must first have in place a multi-hazard mitigation plan. Yellow Medicine County completed the necessary All-Hazard Mitigation Plans between 2009 and 2010. In order to continue to be eligible for HMGP funds, all counties must update their completed plans within five years.

Chippewa, Big Stone, and Yellow Medicine counties with the assistance of the Upper Minnesota Valley Regional Development Commission (UMVRDC) will update the All-Hazard Mitigation plan to meet the requirements of the Disaster Mitigation Act of 2000. All cities and townships are eligible to participate in the county plan instead of completing one on their own. The process to update, write, review and submit should take approximately 18 months to complete.

It is a goal of Yellow Medicine County to involve a great variety of people to ensure that key interests and issues are not left out and to increase the chance for lasting solutions. A task force will be assembled to represent all participating entities (county, cities, and townships) and to guide the planning process. At least three meetings will be held to solicit information, ideas, and comments. Press releases will provide periodic updates.

The first local task force meeting for the Yellow Medicine County All-Hazard Mitigation Plan will occur on Thursday July 31st, 2014 at 7:00pm, at the Yellow Medicine County Courthouse Conference Room in Granite Falls. The main task will be to identify potential hazards. The public is invited to attend and participate in this meeting. Input from the public is extremely important and encouraged. If you have any questions, please contact Emily Zeug-Robertson, UMVRDC, at 320-289-1981 or emily.zeugrobertson@umvrdc.org.

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Yellow Medicine County Hazard Mitigation Task Force Meeting #1

Name	Email Address	Organization/Government
David Finsen		Y.M.C. Council
Tommy Berends		Y.M.C. Commissioner
Don De	gene.stang@hotmai.com	Fort Mc Falls Township
Paul Beas		Old Falls Township
Gymna Kuehn	m-l-k@mtvairclass.com	Echo Township
Michael Krack	" "	Echo Township
Gary Gual		Norman Township
Thomas O'Hoffman	1Phoffman@Frontier.com	Wendland Township
Artis M. Esmeron	patm.esmeron@grandfallsbestcare.com	GF M.H
Tim Perigan		Y.M.C. SO/EM
Leslie Blue		GF PD
Paul Frank	ptfrank@esdvald.com	Rosen Twp Supervisor

**Yellow Medicine County All-Hazard Mitigation Plan
Task Force Meeting #2: Risk Assessment**

September 25th, 2014
7:00-8:30pm
Old City Hall, Clarkfield

Agenda

- 7:00** Task Force Introductions and Public Comment
- 7:15** Hazard Inventory Review
- 7:30** Risk Assessment Activity
- 8:00** Discussion/Questions and Next Meeting: Mitigation Strategies
- 8:15** Meeting with City Representatives

Yellow Medicine County Hazard Mitigation

Task Force Meeting #2

Name	Email Address	Organization/Government
Toy Tiepen	tr-y@redred.com	Wood Lake FD
Brenda Drager	woodlake@redred.com	city of wood lake
Silas Olson	2383 190 Porter	Wiley Tung
Jayna Kuehn	m-l-k@mvtvwireless.com	Echo Swamp
Muel Kuehn	" "	" "
John Berends	john.berends@co.y.mn.gov	Ym County
Nick Johnson	cityadm@carby.mn.gov	Carby
Lou Ann Nagel	louann.nagel@mn.nadnet.net	YMSWCD
Gary L. Johnson	gary.johnson@co.y.mn.gov	Y.M.C
Reg Heglund		YMC
Rike Dahl	mohd.harteyells@beinternet.net	Hanley Falls
Gene Stengel	gene.stengel@hotmail.com	Mn Falls Township

**Yellow Medicine County All-Hazard Mitigation Plan
Task Force Meeting #3: Mitigation Strategies**

October 30th, 2014

3:30-5:30pm

Old City Hall, Clarkfield

Agenda

- 3:30** Task Force Introductions
- 3:35** Review Hazard Priority List
- 3:45** Identification of Completed and New Strategies
- 5:00** Plan Maintenance and Implementation
- 5:15** Questions/Comments – Next meeting will be held February/March 2015.

FOR IMMEDIATE RELEASE

Yellow Medicine County All-Hazard Mitigation

Public Meeting to be held September 25th, 2014

A meeting for the Yellow Medicine County All-Hazard Mitigation Plan will take place on **September 25th, 2014 at 7:00p.m. in the Old City Hall Building in Clarkfield.** The primary tasks will be to discuss city risk assessments and perform a hazard inventory analysis for Yellow Medicine County. Background information for Yellow Medicine County's Hazard Inventory will be available at <http://www.umvrdc.org> under "What's New at UMVRDC" starting September 22nd, 2014. Comments on the material posted can be made by emailing emily.zeugrobertson@umvrdc.org or by calling 320-289-1981 x 104. Public input and attendance at meetings is extremely important and encouraged.

As a result of the Disaster Mitigation Act of 2000, FEMA requires local units of government to update their All-Hazard Mitigation Plan every 5 years in order to continue to be eligible for Hazard Mitigation Grant Program (HMGP) funds. Yellow Medicine County, with the assistance of the Upper Minnesota Valley Regional Development Commission (UMVRDC), is in the process of updating their All-Hazard Mitigation Plan for 2015 that meets FEMA requirements. FEMA has provided part of the funding necessary to complete this plan. The projects listed in this plan will be eligible for future HMGP funds.

If you cannot attend this meeting but would like to be involved, or if you have any questions, please contact Emily Zeug-Robertson at 320-289-1981 or emily.zeugrobertson@umvrdc.org

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Yellow Medicine County Hazard Mitigation

Task Force Meeting #3

Name	Contact	Organization/Government
Gary Leich	320 383 2357	Norman Township
Wick Johnson	507-223-7295	City of Conby
Mike Dell	507-828-4287	City of Hawley Falls
Greg Fiegen	507-530-4564	Wood Lake FD
DeWayne Schmitt	507 829-4331	Wood Lake Mayor
Tom BRENS	320 296 1125	YM County
Teg Hegland	320-524-5841	ymc
Jan An Nagel	320-669-4441	YM SWCD
Sydney Kuehn	507-925-4442	Echo Twp
Muel Kuehn	" " " "	Echo Twp
BRAD FROANO	320 312-3000	Ymc Hwy DEPT.
Kristi Fernholz		UNIVERSITY

**Yellow Medicine County All-Hazard Mitigation Plan
Task Force Meeting #4: Public Meeting and Final Draft Review**

March 26, 2015

7:00-8:30pm

Old City Hall, Clarkfield

Agenda

7:00 Welcome

7:05 Plan Additions

- Addition of Erosion – Gaps and Deficiencies or Strategies
- Hazus Flood Analysis
- Addition of State Parks to Violent Storm Strategies
- Review Prioritization of Natural and Manmade Hazard Strategies
- Infectious Disease Section

7:30 Plan Review

- Previous Feedback – Changes already made
- Task Force and Public Comments

8:15 Next Steps

8:30 Adjourn

PRESS RELEASE

March 12, 2015

FOR IMMEDIATE RELEASE

Yellow Medicine County All-Hazard Mitigation Public Meeting to be held March 26th, 2015

A public meeting for the Yellow Medicine County All-Hazard Mitigation Plan will take place on **March 26th, 2015 at 7:00pm in the Clarkfield City Hall meeting room**. The primary task for the meeting will be to hear public comment and suggestions on the Yellow Medicine County All-Hazard Mitigation Plan draft. A copy of the plan is available at www.umvrdc.org under "What's New at UMRDC". Comments on draft plan can also be made by emailing emily.zandt@umvrdc.org or by calling 320-289-1981 x 104. Input from the public is extremely important and encouraged.

As a result of the Disaster Mitigation Act of 2000, FEMA requires local units of government to update their All-Hazard Mitigation Plan every 5 years in order to continue to be eligible for Hazard Mitigation Grant Program (HMGP) funds. Yellow Medicine County, with assistance from the Upper Minnesota Valley Regional Development Commission (UMVRDC), is in the process of updating their All-Hazard Mitigation Plan for 2015 which will meet FEMA requirements. FEMA has provided a portion of the funding necessary to complete this plan. The projects listed in this plan will be eligible for future HMGP funds.

If you cannot attend this meeting but would like to provide input, or if you have any questions, please contact Emily Zandt at 320-289-1981 x 104 or emily.zandt@umvrdc.org

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Yellow Medicine County Hazard Mitigation

Task Force Meeting #4

Name	Email Address	Organization/Government
Tim Verigan		YMC SO/EM
Mike Dahl		City of Hanky Falls
Jolene Johnson	jolene.johnson@co.y.m.mn.gov	ymc Zoning
Don & Pam Stengel	genestengel@hotmail.com	Mn Falls Township
Peg Haglund		ymc admin.
BRAD FROLAND	brad.froland@co.y.m.mn.gov	ymc Highway
Mark Kuehn		Redwood State
Debbie Kuehn		Wood Lake
Tox Fiegen	tox@redred.com	Wood Lake PD
Sandra Hennen	cityofecho@mnwireless.com	Echo - City Clerk-Treasurer
Brenda Drager	woodlake@redred.com	Wood Lake City Clerk-Treas.
Gary Geil		Norman Township Supervisor
Lyle Samuelson		Norman Township Supervisor
Gary J. Johnson		P.M.C. Comm.
Chris Balfany	christopher.balfany@co.y.m.mn.gov	YMC Zoning & Det.

APPENDIX 13: CITY AND COUNTY PLAN ADOPTION

County Capabilities Checklist

County Name							
Reviewer							
CAPABILITIES	WE HAVE ONE	THIS PLAN IS AVAILABLE ONLINE	POINT PERSON IS ON PLANNING TEAM	POINT PERSON SHOULD BE ON PLANNING TEAM	POINT PERSON CONTACT	LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN	OTHER POINT PERSON CONTACT
Local Planning Plans and Tools							
Capital Improvement Plan							
Redevelopment Plan							
Growth Management Plan							
Emergency Operations Plan							
County / Local Emergency Plan							
County / Local Recovery Plan							
Local Mitigation Plan							
Economic Development Plan							
Land-use Plan							
Pandemic or Public Health Incident Response Plan							
Transportation Plan							
School Disaster Plan							
Environment and Natural Resources Plan							
Strategy Implementation Plan							
County Parks Plan							
Water / Watershed Management Plan							
SWCD Local Water Management Plan							
Wildfire Plan							

Critical Facilities Plan (Mitigation/Response/Recovery)							
College Campus Plans							
Evacuation Route Map / Plan							
Critical Facilities Inventory							
Vulnerable Population Inventory							
Soil Conservations Plans							
Continuity Operations Plan							
Storm Water Plan							
National Flood Insurance Program							
Emergency Response Plan							
Emergency Action Plan							
Groundwater Protection Plan							
Wellhead Protection Plan							
Snow Removal Plan							
Communications Plan							
Regional Development Plans							
NFIP Floodplain Management Plan							
Emergency Response Plan for Nuclear Generating Plant							
Local Planning Assistance Mock-Hazard Plan							
Road Closure Plan							
Human Quarantine Plan							
Wildfire Integrated Response Plan							

National Fire Plan							
Water Emergency and Conservation Plan							
Community Needs Assessment							

CAPABILITIES	WE HAVE ONE	THIS PLAN IS AVAILABLE ONLINE	POINT PERSON IS ON PLANNING TEAM	POINT PERSON SHOULD BE ON PLANNING TEAM	POINT PERSON CONTACT	LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN	OTHER POINT PERSON CONTACT
Policies / Ordinance							
Zoning Ordinance							
Building Code							
Planning Ordinance							
Bluff Land Ordinance							
Fire Code							
Floodplain Ordinance							
Subdivision Ordinance							
Nuisance Ordinance							
Storm Water Ordinance							
Drainage Ordinance							
County Park Ordinance							
Site Plan Review Requirements							
Karst Ordinance							
Shoreland Ordinance							
City Ordinance							
Steep Slope Ordinance							
Soil Erosion Control Ordinance							
Sanitary Sewage Treatment System Ordinance / Solid Waste Management Plan & Ordinance							
Historic Preservation Ordinance							
Land Use Ordinance							
Methamphetamine Lab Ordinance							
Wild & Scenic River District							

CAPABILITIES	WE HAVE ONE	POINT PERSON IS ON PLANNING TEAM	POINT PERSON SHOULD BE ON PLANNING TEAM	POINT PERSON CONTACT	LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN	OTHER POINT PERSON CONTACT
Local Staff/ Departments						
Building Code Official						
Building Inspector						
Mapping Specialist (GIS)						
Engineer						
Land Use Planner						
Public Works Official						
Emergency Management Coordinator / Emergency Management Program						
NFIP Floodplain Administrator						
Bomb and/or Arson Squad						
Emergency Response Team						
Hazardous Materials Expert						
Local Emergency Planning Cmte						
County Emergency Mgmt Cmsn						
Sanitation Department (or Solid Waste)						
Transportation Department						
Economic Development Department						
Environmental Health Department						
Public Works Department						
Building Department						
Housing Department						

Planning Department						
Zoning Department						
Planning Consultant						
Regional Development Commission						
Historic Preservation						
Public Health Coordinator/Department						
Water / Watershed Planner						
Critical Infrastructure Planner						
City Administrator						
County Administrator						
County Assessor						
Environment Services Department						
Citizen Planning Team						
Soil & Water Conservation District						
Sheriff's Department						
Management Information Systems						
Social Services						
County Commissioners						
Fire Department						
Red Cross						
Electric Service Providers (involved)						
Highway Engineer						
Pipeline Companies (involved)						
Hospitals (involved)						
Public Library						
Department of Health						
Human Services						
County Auditor						

Environmental Quality Board						
Watershed Districts						
Community Awareness & Emergency Response (CAER)						
Police Department						
Township Representatives						
Technical Committee						
Non-Governmental Organizations						
Hazardous Substances Emergency Events Surveillance System						
County Attorney						

CAPABILITIES	POINT PERSON IS ON PLANNING TEAM	POINT PERSON SHOULD BE ON PLANNING TEAM	POINT PERSON CONTACT	LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN	OTHER POINT PERSON CONTACT
State of Minnesota					
Minnesota Department of Natural Resources					
Minnesota Department of Agriculture					
Minnesota Department of Transportation					
Minnesota Department of Public Safety					
Minnesota Pollution Control Agency (MPCA)					
Minnesota Historical Society					
Minnesota Department of Homeland Security & Emergency Management Programs (HSEM)					
Minnesota Department of Health					
Minnesota Highway Patrol					
Minnesota National Guard					

CAPABILITIES	POINT PERSON IS ON PLANNING TEAM	POINT PERSON SHOULD BE ON PLANNING TEAM	POINT PERSON CONTACT	LIST ADDITIONAL JURISDICTIONS THAT HAVE THEIR OWN	OTHER POINT PERSON CONTACT
National Organizations					
National Weather Service					
U.S. Forest Service					
U.S. EPA					
U.S. Fish and Wildlife Service					
U.S. Army Corps of Engineers					
U.S. Geological Survey					
Federal Emergency Management Agency (FEMA)					
USDA Natural Resources Conservation					