

## II. Hazards Facing the Community

**This section highlights the hazards that Benton County faces throughout the year.** Note: Hurricanes and earthquakes are not a hazard common to Benton County that is why they are not listed as a natural hazard unique to our area.

The hazards covered in this section are as follows:

### **Natural Hazards**

#### **Summer Storm**

- Severe thunderstorms
- Tornado
- Lightning
- Wind Storm
- Hail Storm

#### **Fire**

#### **Flood**

#### **Winter Storm**

- Blizzard
- Heavy snow or snowstorm
- Ice Storms

#### **Drought**

#### **Extreme Temperature**

- Excessive cold
- Excessive heat

#### **Infectious Disease/Bio-Terrorism**

- Small Pox
- Influenza (flu)
- Tuberculosis
- Hepatitis
- West Nile Virus
- Severe Acute Respiratory Syndrome
- Mad Cow Disease
- Hoof and Mouth Disease

#### **Radon Gas**

### **Non-Natural Hazards**

#### **Hazardous Materials**

#### **Radiological Incident**

#### **Water Supply Contamination or Other Loss of Water**

## Hazard: Summer Storm

**Note:** Lightning, wind and hail are normally present in thunderstorms, tornados can be independent of thunderstorms, but are also associated with them as a by-product.

### ❖ Hazard Profile

Violent storms occur throughout the year in Benton County. For practical purposes violent storms are categorized as summer or winter storms although there is no definite end or beginning to when they might occur. Most summer storm events are associated with severe thunderstorms. Storms are also not confined to any particular geographic area in the county and may occur and inflict damage anywhere they occur. The greatest risk for most people and property is usually confined to urban areas due to the higher density of people and buildings there. However, some storm events, such as hail and straight-line winds can cause significant crop damage and damage to farm buildings. Since agricultural use makes up a greater share of the county's land area than urban areas, agricultural areas are somewhat more likely to experience hailstorms than urban areas.

Every year in the United States, summer storms kill people. Many are killed by flying debris from homes and other structures. Larger impacts on people would be in the largest municipalities because of higher population densities.

### **Locations/Jurisdictions Affected:**

**All cities and townships** within Benton County are susceptible to all of the affects of summer storms on an equal basis.

### ➤ Severe Thunderstorms

Thunderstorms are the most common summer storm in Benton 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 produced by cumulonimbus clouds, always accompanied by lightning, and often having strong wind gusts, heavy rain and sometimes hail or tornadoes.

- Thunderstorms may occur singly, in clusters, or in lines.
- Some of the most severe occur when a single thunderstorm affects one location for an extended time.

- Thunderstorms typically produce heavy rain for a brief period, anywhere from 30 minutes to an hour.
- Warm, humid conditions are highly favorable for thunderstorm development.
- About 10 percent of thunderstorms are classified as severe—one that produces hail at least three-quarters of an inch in diameter, has winds of 58 miles per hour or higher, or produces a tornado.

Source: [://www.fema.gov/hazard/thunderstorm/index.shtml#2](http://www.fema.gov/hazard/thunderstorm/index.shtml#2)

## ➤ **Tornado**

A tornado is defined as a rapidly rotating vortex or funnel of air extending towards the ground from a cumulonimbus cloud.

Tornadoes are the most violent of all storms. No community is without risk; any place in the county is considered to have an equal chance of experiencing a tornado or any other of these severe weather elements.

Minnesota lies along the north edge of the region of maximum tornado occurrence in the United States. Tornado Alley, as that part of the central United States has come to be known, reaches across parts of Texas, Oklahoma, Kansas, Missouri, East Nebraska, and West Iowa.

Source: Minnesota Hazard Mitigation Plan

The tornado is essentially a rapidly rotating column of air that is 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 the 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.

Tornadoes can be categorized as weak, strong and violent; weak tornadoes have a thin rope like quality rotating wind speeds no greater than 110 MPH. A strong tornado has a funnel shaped cloud and have wind speeds from 111 MPH to 200 MPH. Violent tornadoes have the destructive power to uplift solidly constructed buildings however violent tornadoes are less than 2 percent of all tornadoes that happen nationwide and they reach speeds over 201 MPH. A tornado's path typically ranges from 250 feet to a quarter of a mile in width. Larger tornadoes 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 this, too, is variable and consequently cannot be counted on in all instances

## ▪ History

Perhaps the most famous tornado that has ever hit central Minnesota was the tornado of 1886. It struck at around 4:00 p.m. on April 14 of that year. The total losses from this terrible storm included 74 dead and 136 injured. Another major tornado struck Benton County in 1909. Between January 1950 and September 2001, there was one recorded tornado in Benton County with an injury. It occurred on August 15, 1954. One person was injured, and approximately \$25,000 worth of damage occurred. There was also a major summer storm on July 12, 1978.



**Sauk Rapids**-“Private homes, hotels, schoolhouse, church, courthouse, post office, and newspaper office all disappeared as the Sauk Rapid Tornado of 1886 came from the southwest. The newspaper office in Sauk Rapids, which was painted a bright yellow, was lifted away in one piece never to be seen again”.

Source: (Courtesy of Connie Driscoll, Benton County Historical Society and Museum, Sauk Rapids, MN.)

<http://www.rootsweb.ancestry.com/~mnberton/webdoc4.htm>

## Tornadoes in Benton County 1950-2009

6 TORNADO(s) were reported in Benton County, Minnesota between 01/01/1950 and 10/31/2009.

*Click on Location or County to display Details.*

Mag:	Magnitude
Dth:	Deaths
Inj:	Injuries
PrD:	Property Damage
CrD:	Crop Damage

Minnesota									
Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	
1 BENTON COUNTY	08/15/1954	1630	Tornado	F1	0	1	25K	0	
2 BENTON COUNTY	07/18/1970	1910	Tornado	F2	0	0	250K	0	
3 BENTON COUNTY	06/17/1977	1515	Tornado	F2	0	0	250K	0	
4 BENTON COUNTY	09/12/1982	1530	Tornado	F2	0	0	250K	0	
5 BENTON COUNTY	09/12/1982	1620	Tornado	F0	0	0	25K	0	
6 BENTON COUNTY	06/16/1992	2250	Tornado	F2	0	0	0K	0	
<b>TOTALS:</b>					0	1	800K	0	

Source: The National Environmental Satellite, Data, and Information Service (NESDIS)  
<http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms>

**1950-2007 (57 yrs.) # of Tornadoes Total Damages Avg. damage/event Annual Probability Estimated annual loss**

Table 50 Tornado Damages from 1950 - 2007 (estimated annual losses)					
1950-2007 (57 yrs.)	# of Tornadoes	Total Damages	Avg. damage/event	Annual Probability	Estimated annual loss
Benton	6	\$800,000	\$133,333	.1053	\$14,035

Source: 2008 Minnesota State All-Hazard Mitigation Plan

## ➤ Lightning

Lightning is defined as any form of visible electrical discharge caused by Thunderstorms.

While windstorms and tornadoes are also a significant hazard associated with severe thunderstorms, lightning is probably the most frequent hazard associated with thunderstorms and the hazard that causes the most 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 and 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 with in-cloud lightning being the most common.

According to the National Weather Service (NWDS), nationwide, lightning is the number one killer weather phenomena. During a typical year, lightning kills more people than hurricanes, tornadoes, and winter storms combined. NWS-Chanhassen Office estimates that annually, lightning causes two deaths and three injuries in the state.

The average flash of lightning could turn on a 100-watt light bulb for more than 3 months. The air near a lightning strike is hotter than the surface of the sun! The rapid heating and cooling of air near the lightning channel causes a shock wave that will result in thunder.

Every thunderstorm produces lightning. In the United States, on average 300 people are injured and 80 people are killed each year by lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms.

- Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.
- "Heat lightning" is actually lightning from a thunderstorm too far away for thunder to be heard.
- Most lightning deaths and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.
- Your chances of being struck by lightning are estimated to be 1 in 600,000, but could be reduced even further by following safety precautions.

- Lightning strike victims carry no electrical charge and should be attended to immediately.

Source: Minnesota Hazard Mitigation Plan, <http://www.fema.gov/hazard/thunderstorm/index.shtml#2>,  
<http://www.fema.gov/kids/thwhat.htm>

## ➤ Wind Storm

A windstorm is any storm that produces winds in excess of 58 miles per hour, excluding tornadoes.

Windstorms can and do occur in all months of the year; however, 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 can also inflict damage to buildings and in some cases overturn high profile vehicles.

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 at or near the surface. 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.

Source: 2008 Minnesota State All-Hazard Mitigation Plan

### Damage History Due to High Winds

Date	Hazard	Locale	Injuries	Fatalities	Property Damage	Crop Damage
7/27/2002	Severe Storm/Thunder Storm - Wind	Benton	0	0	\$250K	0
6/11/2001	Severe Storm/Thunder Storm - Wind	Benton	0	0	\$50K	0
4/16/2002	Severe Storm/Thunder Storm - Wind	Benton	0	0	\$25K	0
4/16/2002	Severe Storm/Thunder Storm - Wind	Benton	0	0	\$17K	0
8/13/2010	Severe Storm/Thunder Storm - Wind	Benton	1	0	\$1.5M	0

Sources: SHELDUS and NCDC Event History

## Summary of Damages Due to High Winds (2001 – 2010)

2001 - 2010	# of Windstorms	Total Damages	Avg. damage/event	Annual Probability	Estimated annual loss
Benton	5	\$1,842,000	\$368,400	.5000	\$184,200

### ➤ Hailstorm

Hail is precipitation in the form of balls or clumps of ice, produced by thunderstorms. Most incidents for which records exist involve hail 3/4" diameter or more. It 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 and begin to freeze 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 size. Larger hailstones have been reported but occur much less frequently. Strong updrafts are necessary within the cloud to form hail. Strong updrafts are usually associated with severe thunderstorms. Area coverage of individual hailstorms is highly variable and spotty 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.

### ➤ History

Tornados are often viewed as the most damaging summer storm. However, the severe thunderstorm that produces the tornado frequently contains other severe weather elements such as torrential rains, hail, lightning and straight-line winds. Unlike floods, none of these elements is confined to any particular local geographic area within the county. No community is without risk; any place in the county is considered to have an equal chance of experiencing a tornado or any other of these severe weather elements.

Damage due to tornadoes can range from minor to major depending on the strength of the tornado and where it strikes. A tornado that occurs in a rural area could cause crop damage and might damage some farm buildings and injure livestock but the damage would typically be less than in built up areas. Several such tornadoes have occurred in Benton County during the past 30 years. No tornado during this period has affected any of the cities or urbanized portion of the county. The path of Minnesota tornadoes is typically quite narrow, most less than a quarter of a mile and not very long. Consequently, the total area affected by a tornado is not large. However, should a tornado of moderate strength strike a city, damage could be extensive and risk to human life and property high.

Other violent summer storms are also not confined to any particular geographic area in the county and may occur and inflict damage anywhere they occur. The greatest risk for most

people and property is usually confined to urban areas due to the higher density of people and buildings there. However, some storm events, such as hail and straight-line winds can cause significant crop damage and damage to farm buildings. Since agricultural use makes up a greater share of the county's land area than urban areas agricultural areas are somewhat more likely to experience hailstorms than urban areas.

**-Effects on people.** Effects from severe summer storms, like a tornado or lightning, could impact people in the county. Every year in the United States, summer storms kill people. Many are killed by flying debris from homes and other structures. Larger impacts on people would be in the largest municipalities because of higher population densities.

**-Effects on housing.** Since tornadoes and other storms are not confined to any particular area of Benton County, assessing potential risk and damages is difficult.

**- Effects on commercial and industrial structures.** Most of the commercial and industrial facilities are located in cities. The St. Cloud area acts as the regional business center, and impacts on its business district and other commercial businesses would have significant impacts of the community.

**- Effects on infrastructure.** Electric and other public infrastructure could be directly impacted throughout the entire county by severe storms. Specifically, power lines, property damage could be knocked down, resulting in loss of electricity for entire areas of the county. Electricity is very important to the community. It operates businesses, homes and other industrial buildings throughout the county. Other major infrastructure facilities such as the waste treatment plan, water plant, roads and bridges could also be damaged by tornadoes. Tornadoes and windstorms can often scatter knocked down trees and other debris over main roads, limiting travel of emergency vehicles and evacuation routes.

**- Impacts on future development.** Impacts on future development can be minimized through proper planning and land use controls. The county and its cities can mitigate some of the impacts of these deadly storms through strict building code enforcement, proper land use regulations, emergency shelters and improved early warning systems.

## **Economic Impact on Jurisdictions**

The economic impact on an entire jurisdiction can be calculated in dollars by using the current assessed values of buildings within the jurisdiction. To see the assessed values of all buildings within Benton County, which includes townships and cities please refer to *2010 Assessed Property Values for Benton County* at the end of this section. It is impossible to estimate the economic impact without knowing exactly which structures are damaged or destroyed, only the total value can be estimated based on the total destruction of the jurisdiction.

**- Risk assessment conclusion.** Benton County's vulnerability to summer storms, such as tornadoes, flooding or severe thunderstorms, is high. Tornadoes and other summer storms can cause injury and even death to Benton County's residents. This risk is greater in more densely populated areas on the western edge of the county, however in the eastern part of the county the risk increases due to the distance from first responders and medical help. The potential for damage to homes and industrial structures is also high. Large tornadoes with high winds can

destroy many structures. Damage to these structures could be economically draining to the area. In addition, summer storms like tornadoes have the potential to devastate the community with their impact on the community's infrastructure. Power lines, transportation corridors and other infrastructure could be damaged or knocked out temporarily.

Tornados from summer storms while always a threat, remains on the low end of frequency for Benton County. In the last sixty years, Benton County has had only six tornados while Stearns County on our western border has had over forty.

- ◆ **Relationship to Other Hazards – Cascading Effects**

**-Flooding.** Heavy rains and thunder storms can cause localized flooding which can disrupt emergency response, transportation, communication and displacement of the public.

**- Hazard materials.** 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.

**- Power Outage.** Many different storms can damage power lines and other infrastructure, which can lead to temporary disruptions of service.

- ❖ **Plans and Programs**

- ◆ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A3, A4, A5, A6)**

- ◆ **Local Resources**

- 1) General**

- + **Many homes have structurally sound rooms, particularly patio homes.**

- 2) Preparedness / Equipment**

- + **Emergency Mass Notification System** - Benton County now has an expanded emergency mass notification system that gives the county the ability to warn selected areas or the entire county of impending disaster or emergency events. Every City within Benton County has their own account and the ability to warn their citizens.

**Wapicada Golf Course has siren for lightning.** The golf course regularly sounds the siren when lightning is sighted to warn people who are golfing or are in close proximity to the golf course.

- + **Project impact supplied radios to daycares, nursing homes, deaf community, etc.**
- + **Indoor alarm systems for businesses such as Ferches, who would not be able to hear siren.** The incorporation of visible alarm systems in facilities whose occupants would not be able to hear outdoor tornado sirens help to boost the number of people reached by such warning systems.
- + **Siren alarm system is synchronized with other communities.**
- + **Schools have weather radios.**

- + **Nursing homes have weather radios.**

### **3) Response Plans**

- + **Schools have plans.**
- + **Emergency Operations Plan.** Benton County currently has an emergency operations plan, known as the Benton County Emergency Operations Plan.
- + **Skywarn.** There are 120 SkyWarn weather spotters trained by the National Weather Service operating within Benton County.
- + **Many businesses have plans.**
- + **Dispatch has a call list in case of severe weather, including nursing homes, etc**
- + **Nursing homes have plans.**

### **4) Plan Exercises**

- + **Schools hold tornado drills.**
- + **Severe Weather Awareness Week.**

### **5) Mitigation Plans / Projects**

- + **Applied for NOAA/NWS grant** for five outdoor warning sirens to be placed throughout the county. We will continue to seek grants and funds to increase the warning capabilities of the county.

**Expansion of Emergency Mass Notification System** - The EMNS is being expanded to include townships and large groups. For example, the Little Rock Lake Association will have the ability to pass on information via telephone to all LRL residents concerning any flooding or other emergency details.

### **6) Public Awareness**

- + **Severe Weather Awareness Week.**

### **7) Training**

- + **Annual NWS SkyWarn Training**

### **8) Legislation / Codes**

- + **New mobile homes must be tied down.**
- + **Participating jurisdictions have adopted the State Building Code for wind load on structures.**

### **9) Funding Sources**

#### **❖ Gaps and Deficiencies**

**- Fire Departments in Benton County are not trained in SkyWarn. (Update - Sauk Rapids, Rice and Foley all now have some trained weather spotters.)**

**- Used sirens difficult to sell.** Old sirens that have been replaced could be utilized by other communities, but often the cost of installing even a discounted used siren is viewed as prohibitive.

- Many communities do not have adequate sirens.**
- Sirens are designed as outdoor warning system.** People indoors must rely on radio warnings.
- Some populations at particular risk, non-English speakers, hearing impaired, elderly, children, etc.**
- Coordinated sirens can lead to “crying wolf”** For example just because Cold Spring is threatened doesn’t mean Sauk Rapids is, people could become unfazed
- Lack of storm shelters**

- Some houses do not have “safe corner”
- Some employers, etc. have old radios, old plans or no emergency plans
- Not all day cares have weather radio
- Not all mobile home communities have adequate shelters
- Not all mobile home communities have adequate warning systems
- Power and Communication lines are vulnerable to storm damage

## **Hazard: Fire**

### **❖ Hazard Profile**

Fire is a rapid, persistent chemical reaction that releases heat and light, especially the exothermic combination of a combustible substance with oxygen. A fire is categorized as both a natural hazard and a technological hazard that occurs in both the outside and non-outside environments.

Source: Minnesota Hazard Mitigation Plan

A wildfire is an uncontrolled fire spreading 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 start by natural causes like lightning, humans cause four out of every five wildfires. Debris burns, arson or 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 predominant danger from wildfires is the destruction of timber, property and wildlife, and injury or loss of life to people living in the affected area or using the area for recreational facilities.

Urban fires are blazes spreading 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 a threat year round.

### **Locations/Jurisdictions Affected:**

Fires can occur anywhere in the county. Wildfires are more likely to occur in the wooded sections of the county. The cities are at a lower risk than the townships. The **townships**

affected the least by wild fire are **Sauk Rapids** and **Minden**, the rest of the townships are at a higher risk due to the amount of forested land located within their borders.

#### ♦ History

Unfortunately, fires have plagued Benton County throughout its existence. Many structures have been lost to fire over the years, including government buildings, businesses, agricultural structures, churches, and Benton County Fairgrounds facilities major fire destroyed much of downtown Sauk Rapids in July of 1956.

Source: 2008 Minnesota State All-Hazard Mitigation Plan

Wildfires from 1997-2007			
COUNTY	Avg. Acres Burned/Year	Avg. # Fires/Year	#
Benton	170	28.7	

Source: 2008 Minnesota State All-Hazard Mitigation Plan

Source: 2008 Minnesota State All-Hazard Mitigation Plan

Fires have occurred throughout the entire county. However, fires are more probable in cities due to the density and number of both residential and commercial structures.

- **Effects on people and housing.** Wildfires or structural fires can occur at random throughout the entire county, so most of the county's population is potentially at risk from fire.

- **Effects on commercial and industrial structures.** The impacts on commercial structures within Benton County are minimal in the rural townships. Most of the commercial structures throughout the county are located within cities, which have adequate fire departments for suppressing wildfires before they would impact urban centers. However, structural fires pose a larger threat than wildfire, particularly in the urban areas of the county due to the concentration of buildings and people.

- **Effects on infrastructure.** Past wildfires have had minimal impact on infrastructure, and current effects are also minimal.

- **Impacts on future development.** Fire codes should continue to be updated and enforced in order to minimize the risk of fire.

#### **Economic Impact on Jurisdictions**

The economic impact on an entire jurisdiction can be calculated in dollars by using the current assessed values of buildings within the jurisdiction. To see the assessed values of all buildings within Benton County, which includes townships and cities please refer to *2010 Assessed Property Values for Benton County* at the end of this section.

**- Risk assessment conclusion.** Fires within Benton County are a main concern. The cities are the most at risk from fires, due to the density of structures. The major wildfire risk in the county is in the northwestern section of the county, where there exist many coniferous types of woodland.

♦ **Relationship to Other Hazards – Cascading Effects**

**-Flooding and erosion.** Major wildfires can 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.**

**- Power Outage.** Major fires can destroy structures, including essential public facilities, and utilities like electric and gas lines can be damaged and even destroyed.

❖ Plans and Programs

♦ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A1, A14)**

♦ **Local Resources**

**1) General**

+ Local Fire Departments.

**2) Preparedness / Equipment**

+ Public Schools inspection program

*See: [www.dps.state.mn.us/fmarshal/mfirs/FireinMinnesota2000.pdf](http://www.dps.state.mn.us/fmarshal/mfirs/FireinMinnesota2000.pdf)*

+ Sprinklers in businesses.

+ Sprinklers in schools.

+ FD's help to replace smoke detectors.

**3) Response Plans**

+ **Emergency Operations Plan.** Benton County currently has an emergency response plan, known as the Benton County Emergency Operations Plan.

+ **Employers have alarms / plans.**

+ **Schools have alarms / plans.**

+ **FD Mutual Aid Agreements.**

+ **DNR has helicopters and plans for wildfires.**

**4) Plan Exercises**

+ Schools hold Fire Drills.

**5) Mitigation Plans / Projects**

+ **GIS, identifying risks, inspections.**

+ **Insurance cracking down on wood burners, unkempt lawns, wood piles near houses, etc.**

+ **Hydrants in plotted areas of cities.**

**6) Public Awareness**

+ **Public Education Programs see:**

*[www.dps.state.mn.us/fmarshal/mfirs/FireinMinnesota2000.pdf](http://www.dps.state.mn.us/fmarshal/mfirs/FireinMinnesota2000.pdf)*

**7) Training**

**8) Legislation / Codes**

+ **Ordinances for cul de sacs to be wide enough for fire trucks.**

+ **Ordinances for more than one exit per development.**

## **9) Funding Sources**

### **❖ Gaps and Deficiencies**

- Not much funding available for FD equipment or training.
- Apartment building in Foley has no sprinkler system, may be others.
- Resources for clearing downed timber from storms is lacking.

## **Hazard: Flood**

### **❖ Hazard Profile**

A flood is defined as the overflowing of rivers, streams, and lakes due to excessive rainfall or rapid snowmelt. There are several forms of flooding including flash floods (quickly rising streams after heavy rain or rapid snowmelt); ice jam (ice that accumulates at a natural or human-made obstruction and slows the flow of water); riverine (periodic overflow of rivers and streams); and urban (overflow of storm sewer systems following heavy rain or rapid snowmelt exceeding the system capacity).

Source: Minnesota Hazard Mitigation Plan

For floodplain management purposes, the Federal Emergency Management Agency uses the concept of a “100-year flood.” The term “100-year flood” is misleading. It is not a flood that will occur once every 100 years. Rather, it is the flood elevation that has a 1 percent chance of being equaled or exceeded each year. Thus, the 100-year flood could occur more than once in a relatively short period. 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 System (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 rainfalls. Floods can, however, result from human causes as a dam impoundment bursting (the Johnstown Flood of Pennsylvania in 1889).

Dams and levees are man-made structures that can, if not properly constructed or maintained, result in increased flooding due to a failure. Dams can also cause flooding either upstream or downstream, if improperly operated.

Source: Minnesota Hazard Mitigation Plan

Dam failure can be caused by an array of situations, including flood events, poor

operation, lack of maintenance or repair, and terrorism. The water held back by a dam can flow very quickly downstream in a wall of water, damaging anything in its path. The amount of water released would depend on the size of the dam and the amount of water it is holding. Although uncommon, dam failures are a potential danger to riverside communities.

### **Locations/Jurisdictions Affected:**

Benton County has few lakes but many streams and small rivers. Normally the flooding of these causes little damage other than to a small number of bridges and culverts. Most of the land in the floodplains is farmland or undeveloped land. However there are a few areas of the county that do have flooding problems.

Flooding on a small scale can occur within the **City of Foley**.

Flooding can occur within the **City of Sauk Rapids**, but it is limited to a few mobile homes and homes next to the Mississippi River.

Flooding can occur within the **City of Sartell**. A dam exists in Sartell and is managed by Verso Paper Mill. Severe flooding in this area could put the Mill at risk, which is one of the county's largest employers. A smaller number of homes and businesses would also be impacted.

Major flooding has occurred on Little Rock Lake, which is located within **Langola** and **Watab Townships**.

#### ♦ **History**

There have been several flooding events in the history of Benton County. Here is an excerpt from the Benton County Comprehensive Local Water Use Plan:

#### Major Floods, Discharge, and Estimated Frequency

Date of Flood	Discharge (CFS)	Estimated Frequency (Years)
April 16, 1965	37,000	43
April 14, 1969	32,400	22
April 29, 1975	30,700	20
July 25, 1972	30,100	17
April 13, 1952	29,400	15
May 9, 1950	28,000	12
May 27, 1962	25,700	9

A major flood occurred on Little Rock Lake in April 1965, which had an estimated frequency of 43 years. This flood caused \$91,000.00 in damages and reached an elevation of 1021.3 feet at the Northbound U.S. Highway 10 bridge. Another flood occurred on Little Rock

Lake in April 1969, which had an estimated frequency of 22 years. This flood caused \$10,400.00 in total damage.

A major flood occurred on the Platte River at Royalton on July 26, 1972. This flood had an estimated frequency of 100 years, and had a discharge of 6,850 cfs.

NOAA's National Climatic Data Center reports several flood events. A series of floods occurred from April 1, 2001 through April 22, 2010. The damage occurred over several counties in central Minnesota. About 500 homes in Benton County sustained water damage to basements. Roads were submerged and some bridges flooded throughout the region. Damages to Benton County were estimated at \$8.4 million and no fatalities or injuries were reported. Another flood was reported in Benton County on July 10, 2002. No fatalities or injuries were reported. Approximates \$250,000 in property damage occurred and \$2.5 million in crop damages were estimated.

To date, there have not been any Flood Damage Reduction (FDR) projects conducted in Benton County. A re-evaluation of the 100-year floodplain elevation for Little Rock Lake may be warranted in the future, to deal with the existing and proposed development around the lake. This activity will be coordinated with the DNR area hydrologist. There has also been extensive flooding around Little Rock Lake in recent years.

Several dam failures have occurred in Minnesota in the past, although none has been reported in Benton County.

The following figure shows the insured crop losses due to water-related incidents during the period of 1994-2006.

Source: 2008 Minnesota State All-Hazard Mitigation Plan

### **Agricultural Losses from Water-Related Insurance Claims from 1994-2006**

Benton \$5,417,388

Source: 2008 Minnesota State All-Hazard Mitigation Plan

## **❖ Risk Assessment - Floods**

Potential Hazard	Frequency	Magnitude	Warning Time	Severity	Special Characteristics	Risk Priority
Flooding	2. Possible	2. Limited	3. 6-12 Hours	2. Limited	Road Washouts Flood Ins	9

According to the flood data published by FEMA, Benton County has approximately 5.3% of its total area within the 100-year floodplain. The 500-year floodplain makes up roughly 0.2%, which means that the portion of Benton County that is within either the 100-year or 500-year floodplain is about 5.5% of the county's total area.

Flood Plain Maps	Map #'s, Appendix D
Benton County	21
Foley	22
Rice	23
Sauk Rapids	24

**-Effects on people and housing.** A GIS mapping estimate suggests that at least 400+ Benton County addresses are properties that are within the 100-year or 500-year floodplain. The 400+ identified properties have a combined total property value of approximately \$33,275,000. This is only a rough estimation, as the list of addresses was not comprehensive. The actual value of properties potentially affected by flooding is difficult to determine due to the reduction in property values during this great recession. Two mobile homes and three day cares are also located within the floodplain.

**- Effects on commercial and industrial structures.** There are currently no commercial or industrial structures located within the floodplain of Benton County.

**- Effects on infrastructure.** Several roads throughout the county are vulnerable to being flooded. Though less of a risk, bridges might also be damaged in times of flooding. There is a risk that flooding could impact ditches and culverts. The county administrative building has a history of minor flooding. Ronneby City Hall is located in the floodplain.

**- Impacts on future development.** Benton County is experiencing growth, and this will be a major issue. Developments should adhere to all zoning ordinances – existing structures within the floodplain are “grandfathered” in, but the county anticipates that this number will decrease over time, both from the possibility of buyout mitigation programs and gradual depreciation. No major construction projects are allowed in the floodplain, even for upgrading existing structures.

### Economic Impact on Jurisdictions

The economic impact on an entire jurisdiction can be calculated in dollars by using the current assessed values of buildings within the jurisdiction. To see the assessed values of all buildings within Benton County, which includes townships and cities please refer to *2010 Assessed Property Values for Benton County* at the end of this section.

#### All Flood Zones

Parcels	2221
Total Land Value	\$212,432,100
Total Building Value	\$182,745,900
Total Value	\$395,202,700

#### 100 Year Flood Zone

Parcels	2140
Total Land Value	\$207,652,600

Total Building Value	\$176,187,500
Total Value	\$383,864,800

#### 500 Year Flood Zone \*

Parcels	81
Total Land Value	\$4,779,500
Total Building Value	\$6,558,400
Total Value	\$11,337,900

\* Those parcels in the 500 year flood zone that are not also in the 100 year flood zone.

### NFIP Participation

Participation in the National Flood Insurance Program is limited to the County and the Cities of Sauk Rapids and Foley.

Benton County participates in the NFIP by administering Benton County Ordinance 196 Flood Plain Management Ordinances. To implement this program Benton County utilizes FEMA flood zone maps to determine areas of high flood potential, in areas where the county has limited information we utilized highway department bridge information or require the applicant to hire hydrologist/engineer to conduct hydraulic analysis to determine 100-year flood. Benton County also utilizes Department of Natural Resources Division of Waters to assist in making these determinations. As part of this implementation, Benton County requires that the lowest floor elevations of all structures are constructed to meet FEMA standards, in that we require that they are constructed so the lowest floor elevation is a minimum 1 foot above the 1 hundred year flood elevation and or highest known water mark. As part of this, the county requires applicants to submit flood certifications signed by an engineer or hydrologist showing they meet this requirement. In addition, Conditional Use Permits are required for any alternative flood proofing measures, such as raising building using tuck under garages, crawl spaces, stilts anything but fill. Benton County also assist applicants with filing of LOMA's etc.

Benton County will continue to be NFIP compliant by adopting and utilizing the most up to date information and the new Flood Zone mapping and by revising our Flood Plain Ordinance to adopt these maps. Benton County will also make an attempt to produce Lidar Mapping for the entire county to help us more accurately determine the areas with the greatest flood potential. In short, Benton County will revise its Flood Plain Ordinance to utilize the most current information to be as accurate as possible while at the same time continue to model our streams and flood prone areas to continue to improve the accuracy of our data. Also as part of an outreach program, Benton County plans to continue to update our GIS systems to show the flood prone areas and make this information available to the public via the Benton County Web-site.

#### Summary of Flood Plain Amendment

Under the Flood Disaster Protection Act of 1973, as amended, local governments as a condition of future Federal financial assistance are required to adopt floodplain ordinances with enforcement provisions consistent with Federal standards to reduce or avoid future

flood losses. Another provision requires that flood insurance must be purchased by property owners seeking any Federal financial assistance for construction or acquisition of buildings in Special Flood Hazard Areas (SFHAs).

Benton County is a part of the National Flood Insurance Program (NFIP) that provides for subsidized flood insurance rates for participating communities. As a part of this program the Federal Emergency Management Agency (FEMA) conducted a multi-year floodplain study to update and create electronic maps across the Country including Benton County. Updates to these maps are necessary because of physical changes in the floodplains caused by land use, development, erosion, and natural forces.

In addition to updating the floodplain maps, FEMA has also made amendments to the Code of Federal Regulations Code 44, Section 60.3 (d) National Flood Insurance Program (NFIP) regulations. In order to maintain NFIP eligibility the County must update their floodplain ordinances to comply with the new regulations, which includes adopting the new floodplain maps.

The floodplain ordinance amendments include the requirement to adopt the new floodplain maps by August 16, 2011, new definitions, changes to permitted and conditional/interim uses in the Floodway and Flood Fringe districts, new administration requirements for issuing a permit in a general Flood Plain District, additional criteria for the County to authorize a variance in a floodplain, and additional restrictions on alterations to existing nonconforming structures and uses in a floodplain.

The Cities of Sauk Rapids and Foley depend upon the County for most of the same information. They enforce their flood plain ordinances in the same manner as the County. They also maintain compliance by following the County model.

The City of Sauk Rapids enforces its flood plain through the following ordinance; Chapter 11 Index Flood Plain Zoning.

### **Repetitive Loss Properties as identified by NFIP**

**Rice** This residence is on Little Rock Lake within 100 yr flood was require to flood proof and flood cert to 1022.7 lowest floor however I found no certification by a professional engineer was found. Most building occurred in early 1990's 1991. It is in the Rose Anna Beach plat. To be followed up.

**Rice.** This residence is similar to the one above. It is located in plat called Oherleins Point on Little Rock Lake. A garage was built in 1981 or so and was required to be flood proof and flood cert. We have no record it was ever done, nor information on house construction. This should be constructed to 1022.7 or one foot above 100 yr flood elevation of Little Rock, however the house could be older because there is no permit info nor flood proof information. To be followed up.

**Foley.** The address is in the City of Foley so we have no permits for it To be followed up.

- ♦ **Relationship to Other Hazards – Cascading Effects**  
- Fire.

- Hazardous Materials.
- Infectious Disease.

## ❖ Plans and Programs

### ♦ State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A2, A15)

#### ♦ Local Resources

##### 1) General

##### 2) Preparedness / Equipment

- + Sandbags have been stockpiled
- + Sandbagging sites have been identified
- + Sand sources have been set up

##### 3) Response Plans

- + **Emergency Operations Plan.** Benton County currently has an emergency operations plan, known as the Benton County Emergency Operations Plan, which deals with a potential flood or dam failure.

##### 4) Plan Exercises

- + Dams inspected periodically.

##### 5) Mitigation Plans / Projects

- + **DNR wetland inventory, protected wetlands.** The DNR has a comprehensive list of all wetland areas in the state, some of which are set aside as protected reserves.
- + **Organizations such as Ducks Unlimited replenish wetlands.**
- + **Culverts, ditches.** Benton County has a network of culverts and ditches in place to promote drainage and to help mitigate flooding in the county.
- + **Storm sewers.** Each of the municipalities in Benton County has a system of storm sewers to prevent urban flooding.
- + **New divisions have holding ponds.** Newly constructed housing developments are required to have holding ponds to help prevent flooding in the area. This is one way to limit the negative impact of the loss of natural wetlands.
- + **Raising homes at Little Rock Lake.** There are some mitigation efforts in the area of Little Rock Lake, such as the raising of homes, this continues. Some homes have raised power sources, air conditioners by placing on platforms above the record high water levels.

##### 6) Public Awareness

- + LRLA promotes awareness among its members.

##### 7) Training

- + CERT members have been trained in sandbagging and dike construction.

##### 8) Legislation/Codes

- + **Wetland building ordinances.** The DNR designated wetland areas must be taken into account when developing property. If wetland is to be drained, new land must be transferred to a wetland state within the same water table.
- + **Floodplain building ordinances.** Benton County has passed ordinances that no new buildings may be constructed within the 100-year floodplain, and that no significant projects may be undertaken in that area as well.
- + **Required to disclose if property to be sold has had history of flooding.** If a property has a history of flooding, the seller is legally obligated to inform potential buyers.

## **9) Funding Sources**

### **❖ Gaps and Deficiencies**

- **Loss of wetlands increases speed and severity of floods.** The lack of natural water retention in wetland areas can increase speed and severity of floods, particularly in densely populated areas.
- **Floodplain info may not be perfect.** The data about the 100-year floodplain distributed by FEMA carries this disclaimer: “The FEMA Floodways data exists only in developed areas. Do not expect this data to be a comprehensive source of flood information. The data are generally consistent with other sources of DNR GIS data (including DEMs, lakes, streams), but no detailed analysis of consistency has been performed.”
- **Ditches in disrepair.** There are some reports of county ditches and culverts that are at least partially blocked or no longer functioning properly. This could have a negative impact on large portions of the county.
- **Holding ponds in new developments may not be placed effectively.** While holding ponds may be a useful way to mitigate floods in housing developments, they must be properly positioned and designed in order to have the intended effect.
- **Townships do not always have enough road signs to block off dangerous flooded areas.** Lack of warning signs may cause increased risk of injury or death, particularly during a flash flood. (Several Townships now have a supply of road-closed signs).
- **“Solving” a water problem usually just transfers it to someone else.** The dynamics of hydrology are such that often a solution to a local problem will simply transfer the issue to another community.

## **Hazard: Winter Storm**

### **❖ Hazard Profile**

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

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

#### **➤ Blizzard**

Blizzards, the most violent of the winter storms, are characterized by low temperatures, usually below 20° Fahrenheit, accompanied by strong winds in excess of 35 miles per hour with enough snow in the air caused by either falling or blowing snow to create visibilities of one-quarter mile or less for an extended period of time, usually at least three hours or more. While blizzards can occur in Benton County from October through April, they most commonly occur from November through the end of March.

## ➤ Heavy Snow or Snowstorm

In Minnesota, a heavy snow event is defined by six or more inches of snow in a 12-hour period and eight or more inches of snow in a 24-hour period. Snow is considered heavy when visibilities drop below one-quarter mile regardless of wind speed.

## ➤ Ice Storms

- **Freezing Rain.** Freezing rain, probably the most serious of the ice storms, occurs during a precipitation event when warm air aloft exceeds 32° while the surface remains below the freezing point. When precipitation originating as rain or drizzle contacts physical structures on the surface ice forms on all surfaces creating 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 that has below freezing temperatures allowing the rain drops to freeze before reaching the ground. Sleet is also referred to as ice pellets. Sleet storms are usually of shorter duration than freezing rain and generally create fewer problems.

### **Locations/Jurisdictions Affected:**

**Any and all** locations within the county are at risk.

## ◆ History

Winter storms have affected Benton County many times. Some memorable snowfalls include the Armistice Day Blizzard on November 11, 1940, the winter of 1965-1966, and a few major storms in the early 1970's.

## ❖ Risk Assessment

While all winter storms pose some risk, ice storms probably pose the most risk. While ice storms are unlikely to inflict serious damage to households or public buildings, they can result in significant safety concerns for the traveling public. Like the severe summer storms, ice storms are not confined to any particular geographic area although those areas having higher population densities and therefore more power lines, trees and other public infrastructure are at greater risk for property loss than other parts of the county.

Other winter storms posing some degree of threat to the county, its people, livestock and structures are blizzards, the extremely cold temperatures that follow blizzards, and very heavy snowstorms. Based on an historical analysis of heavy snowstorms, the extreme southeastern portion of the county is slightly more susceptible to this winter storm although all parts of the county are at risk.

Blizzards create a greater safety risk in the northeastern portion of the county, due to its more open landscape. The risk is primarily to travelers, truckers and delivery personnel because of severe drifting of snow and the poor visibility that accompanies these storms.

**-Effects on people.** Ice storms affect the mobility of people whether traveling by automobile or on foot and can create significant safety concerns, particularly for the elderly and others whose mobility may be restricted.

The risk to people caused by ice storms is generally quite limited since storms of long duration and heavy precipitation are not frequent and most people can avoid being out during the storm. In addition, warnings for these storms usually provide significant lead time to make alternate plans or seek shelter. For people who must be out or are caught unaware there are significant safety risks whether traveling by car or foot at least until these surfaces can be treated with sand or chemicals to reduce slippage.

One of the greatest threats to people from these storms is the loss of power, sometimes for long periods of time and the much colder temperatures, which typically follow a winter storm. People are at some risk to severe cold particularly if they live in remote areas that have experienced power outages that may be difficult to get to because of impassable roads. Livestock is also at risk during these events.

**- Effects on residential, commercial, and industrial structures.** Structural risks in general are minimal. The greatest risk to housing is damage caused by falling tree limbs; in addition to structural damage property owners also suffer additional property loss because of damage to other landscaping from heavy ice accumulation.

**- Effects on infrastructure.** The county's critical facilities most likely to be threatened by an ice storm are its parks, mainly its trees and other plantings. Most other public buildings would be at very low risk, since trees are usually well spaced, planted at a safe distance from the buildings and better cared for than those in residential areas.

County road crews and county equipment necessary to combat the storm face at least a limited risk while trying to make roads safer for the public, commercial, and industrial vehicles and activities.

Infrastructure, which is most at risk, is the aboveground utility lines. The risk is higher in cities because of the potential for ice-laden tree limbs to fall on weighted utility lines; however, rural areas are also at risk where the sheer weight of the ice combined with the potential for higher winds is often enough to take down utility lines.

Blizzards also pose some risk to equipment and county personnel responsible for clearing roads. In assessing risk to snow events, the county has identified those spots on the county highway system most susceptible to severe drifting and poor visibility.

## **Economic Impact on Jurisdictions**

The value of the impact would be limited to the number of buildings and infrastructure that would sustain damage due to a winter storm.

The economic impact on an entire jurisdiction can be calculated in dollars by using the current assessed values of buildings within the jurisdiction. To see the assessed values of all buildings within Benton County, which includes townships and cities please refer to *2010 Assessed Property Values for Benton County* at the end of this section.

**- Risk assessment conclusion.** The risk potential for winter storms in Benton County is moderate. Winter storms are common; however, many storms and their impacts can be predictable. One risk with winter storms is that people's mobility is limited, especially during

ice storms. Travel by automobile or on foot can create significant safety concerns, particularly for the elderly and others whose mobility may be restricted. Infrastructure, particularly overhead power lines, is also at risk of winter storms. Ice and wind can take down power lines, which could knock out power for residents and businesses.

♦ **Relationship to Other Hazards – Cascading Effects**

- **Power Outage.** Many different storms can damage power lines and other infrastructure, which can lead to temporary disruptions of service.

- **Flooding.** Heavy snows and snowmelt can cause flooding which can disrupt emergency response, transportation and communication.

- **Extreme Temperature.**

❖ Plans and Programs

♦ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A8, A10)**

♦ **Local Resources**

**1) General**

**2) Preparedness / Equipment**

- + Schools have weather radios.
- + Nursing homes have weather radios.
- + Fire departments have plows that can get through snow in case of emergency.
- + County and Cities have plows and trucks available for sanding.
- + Local power utilities have emergency response crews.

**3) Response Plans**

- + **Emergency Operations Plan.** Benton County currently has an emergency operations plan, known as the Benton County Emergency Operations Plan
- + School late starts, early dismissal, cancellation.
- + Agreement with snowmobile clubs.
- + Identification of supplies of generators.

**4) Plan Exercises**

**5) Mitigation Plans / Projects**

**6) Public Awareness**

- + September Preparedness Month PSA's
- + Winter Weather Awareness Week PSA's
- + General Preparedness Information

**7) Training**

**8) Legislation / Codes**

**9) Funding Sources**

❖ **Gaps and Deficiencies**

- **Many people, particularly the elderly, need to receive prescription medications and food.**

- **Weather alerts and travel advisories may not be heard.**

## **Hazard: Drought**

## ❖ Hazard Profile

A drought is a period of abnormally dry weather that persists long enough to produce a serious hydrologic imbalance (for example crop damage, water supply shortage, etc.) The severity of the drought depends upon the degree of moisture deficiency, the duration, and the size of the affected area.

Although the effects of a drought are easily recognized, a drought eludes simple definition. As noted by the Water Resources Center, University of Minnesota, drought is a difficult condition to define because the requirements for water vary so widely. For example, drought for a crop commences when the soil is deficient in supplying moisture for particular physiologic stages. Thus, drought is not uniform for different crops or even within areas as small as a farm or a single field. For the urban dweller, a drought commences when the reservoir or water source is low and restrictions in the use of water are required. A satisfactory definition requires that a demand for water exists and that the demand be greater than the amount supplied at a particular time.

### **Locations/Jurisdictions Affected:**

Drought would affect all cities and townships within the county. Many farms have their own wells for irrigation, those without it are at greater risk.

#### ♦ History

There have been several droughts in the history of Benton County. Statewide droughts occurred during the time periods of 1911-1914, 1931-1942, the mid-1960's, 1976-1977, and 1987-1989. To date, the county has never reached a total crop failure.



**-Effects on people and housing.** Drought poses only a minimal risk to the cities, houses and the persons residing there. Trees, shrubs and other plants are at some risk during extended dry periods but because of a municipal water system, this risk is minimal since most properties can be irrigated.

The water supply for rural residents is at some risk during extended dry periods when annual rainfall is below normal for several years. In these instances, some shallow wells have failed. An inventory of rural wells, their condition, depth, water quality and water availability should be undertaken in order to more accurately determine risk.

**- Effects on agriculture.** Benton County is predominantly cultivated land, with 52.7 percent, or approximately 139,117 acres, of tillable land. Every year at least some portion of the county can expect a dry spell, which may stress grass and other plants but seldom is severe enough to significantly reduce agricultural production. Hay production may be more impacted from these more regular dry spells than crops such as corn and soybeans.

Livestock watering ponds can be impacted by dry conditions but most agricultural operations also have other sources of water for animals.

Severe drought like that which occurred during the 1930s could still result in significant crop loss in spite of improved seed varieties that are more drought resistant. Assessing the number of acres in particular crops and an estimate of the value of these crops per bushel will help the county determine potential dollar loss should a severe drought occur. While complete crop failure is unlikely, a significant reduction in production could result depending on the timing and severity of the drought.

**- Effects on commercial structures, industrial structures, and infrastructure.** Very minimal impact but during a severe drought there could be some supply risk for commercial and industrial wells that are relatively shallow.

### **Economic Impact on Jurisdictions**

The economic impact of a drought would be determined by the amount of crops lost to it. Since Benton County is a rural county and has a large number of tillable acreage, 50,000 acres it could have a large economic impact. Even though this would affect **mainly townships**, the ripple effect would cause economic hardship to all businesses in **all** jurisdictions.

**- Risk assessment conclusion.** Droughts are mainly feared for their negative economic impact. Because of the slow onset of a drought, it is not viewed as a major risk for injury, death, or infrastructure. The main concern during a drought would be agriculture, but a drought can negatively affect many water-dependant industries such as public utilities, forestry, and tourism as well.

♦ **Relationship to Other Hazards – Cascading Effects**

**-Fire.** Droughts can significantly increase the threat of fires, particularly wildfires.

♦ **Plans and Programs**

♦ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A9)**

♦ **Local Resources**

**1) General**

**2) Preparedness / Equipment**

**3) Response Plans**

+ **Benton County has adopted a Comprehensive Local Water Use Plan.** This plan forms a cohesive framework for best utilizing and protecting Benton County's natural water resources.

**4) Plan Exercises**

**5) Mitigation Plans / Projects**

**6) Public Awareness**

+ Several cities have instituted water restrictions.

**7) Training**

**8) Legislation / Codes**

+ Authorities will shut down irrigation when necessary.

+ Permit needed for minimum water pumping, maximum limits imposed.

**9) Funding Sources**

## ❖ Gaps and Deficiencies

### **Hazard: Extreme Temperature**

**Extreme temperatures are a function of both summer and winter storms and weather, so their ratings would be similar to the ratings for summer storms and snowstorms.**

## ❖ Hazard Profile

According to the National Weather Service (NWS), extreme temperatures in Minnesota are characterized by issuance of Wind Chill Warnings or Advisories in the winter months, and by the issuance of Excessive Heat Warnings or Heat Advisories in the summer months.

#### **Locations/Jurisdictions Affected:**

**All areas and jurisdictions** within Benton County are at risk.

### ➤ Excessive Cold

The NWS issues a Wind Chill Advisory for Minnesota when widespread wind chills of 40 degrees below zero or lower with winds at least 10 miles per hour (mph) are expected. In some parts of southern Minnesota, the threshold may be 35 degrees below zero.

### ◆ Extreme Cold History

A source of NWS Significant Event Definitions/Thresholds for extreme temperatures in Minnesota can be found at: <http://www.crh.noaa.gov/mpx/nwseventdef.html>

### ➤ Excessive Heat

The NWS issues a Heat Advisory for Minnesota when, during a 24-hour period, the Heat Index ranges from 105 to 114 degrees during the day, and remains at or above 80 degrees at night. An Excessive Heat Warning is issued when, during a 24-hour period, the Heat Index reaches 115 degrees or more during the day, and remains at or above 80 degrees at night. An Excessive Heat Watch may precede a Warning.

### ◆ Extreme Heat History

A source of NWS Significant Event Definitions/Thresholds for extreme temperatures in Minnesota can be found at: <http://www.crh.noaa.gov/mpx/nwseventdef.html>

## ❖ Risk Assessment - Extreme Temperature

### **Economic Impact on Jurisdictions**

The economic impact would most likely occur from any loss of business or cost of utilities for either additional heating or cooling. Compared to other hazards the economic impact would be considerably less.

**- Risk assessment conclusion.** Certain segments of the population are at heightened risk of

being adversely affected by extreme temperatures, including those with chronic health problems, the elderly, and children.

- ◆ **Relationship with Other Hazard – Cascading Effects**
  - **Winter Storm.** Temperature extremes can be associated with inclement weather.
  - **Fire.** Dry, hot conditions can increase the risk of fires, particularly wildfires.
  - **Drought.** Extended high temperatures can increase the impact of drought.
- ❖ **Plans and Programs**
  - ◆ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A7)**
  - ◆ **Local Resources**

#### **1) General**

#### **2) Preparedness / Equipment**

- + **Human Services has list of those who would need assistance.** The Benton County Human Services Department maintains a list of people who would be particularly vulnerable during an emergency situation.
- + **Many area schools, day cares, and nursing homes have weather radios.** The National Oceanic and Atmospheric Administration (NOAA) Weather Radio will notify these locations of any weather alerts put out by the National Weather Service (NWS).

#### **3) Response Plans**

- + **Central Minnesota Chapter of the Red Cross has a Congregate Care Plan.** Part of the county's Emergency Operations Plan, the Red Cross has agreements with many area facilities to be activated as shelters if the need arose.
- + **First Call for Help.** This United Way agency is a hotline intended to serve as a comprehensive list of all resources available in the area for people who need some sort of assistance. Operators tell callers about the different options available to them and assist them in getting help from the appropriate resource.
- + **TriCAP has a program to assist those who need help with heating bills.** TriCAP has a budget to help people who have a difficult time affording fuel or electricity during the winter months.

#### **4) Plan Exercise**

#### **5) Mitigation Plans / Projects**

#### **6) Public Awareness**

- + Heat Advisories, winter advisories from National Weather Service.

#### **7) Training**

#### **8) Legislation / Codes**

#### **9) Funding Sources**

- ❖ Program Gaps or Deficiencies
  - **Human Services list is incomplete, constantly changing.**
  - **Some residents have difficulty asking for assistance.**

## **Hazard: Infectious Disease / Bio-Terrorism**

#### ❖ Hazard Profile

An infectious disease is defined as an organism or matter 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 medical breakthroughs and technology, infectious diseases continue to pose an important public health problem. Today, the issue of emerging and re-emerging infectious diseases is at the forefront of public health concern. The very young, older adults and hospitalized and institutionalized patients are at increased risk for many infectious diseases. Changes in demographics, lifestyle, technology, land use practices, food production and distribution methods, and childcare practices, as well as increasing poverty, have a role in emerging infections.

Many infectious diseases are preventable and are controllable. Prevention and control of infectious diseases involve collection of accurate assessment data (such as surveillance data for specific conditions), outbreak detection and investigation, and development of appropriate control strategies (both short and long term) based on specific epidemiologic data. These activities require close collaboration between 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 industry (particularly food producers and food-service industries), health-care students and providers, along with research to improve immunizations, diagnostic methods, and therapeutic modalities. Thus, the prevention of infectious diseases requires multidisciplinary interventions involving public health professionals, medical practitioners, researchers, community-based organizations, volunteer and private groups, industrial representatives, and educational systems.

Some infectious diseases that could affect Benton County include:

**-Smallpox.** Smallpox has not been an issue in the United States for more than 50 years, but with the threat of terrorism this disease has been thrust to the forefront of public concern and fear. Smallpox is a serious, contagious, and sometimes fatal infectious disease. There is no specific treatment for smallpox, and the only prevention is vaccination. The name *smallpox* is derived from the Latin word for “spotted” and refers to the raised bumps that appear on the face and body of an infected person.

There are two clinical forms of smallpox. Variola major is the severe and most common form of smallpox, with a more extensive rash and higher fever. There are four types of variola major smallpox: ordinary (the most frequent type, accounting for 90 percent or more of cases); modified (mild and occurring in previously vaccinated persons); flat; and hemorrhagic (both rare and very severe). Historically, variola major has an overall fatality rate of about 30 percent; however, flat and hemorrhagic smallpox usually are fatal. Variola minor is a less common presentation of smallpox, and a much less severe disease, with death rates historically of 1 percent or less.

**- Influenza (Flu).** Influenza is a contagious disease that is caused by the influenza virus. It attacks the respiratory tract in humans (nose, throat and lungs). The flu is different from a

cold. The flu usually comes on suddenly and may include these symptoms: fever, headache, tiredness (can be extreme), dry cough, sore throat, nasal congestion and body aches.

Influenza types A or B viruses cause epidemics of disease almost every winter. In the United States, these winter influenza epidemics can cause illness in 10 to 20 percent of people and are associated with an average of 20,000 deaths and 114,000 hospitalizations per year. Getting a flu shot can prevent illness from types A and B influenza. Influenza type C infections cause a mild respiratory illness and are not thought to cause epidemics. The flu shot does not protect against type C influenza. Influenza type A viruses are divided into subtypes based on two proteins on the surface of the virus. These proteins are called hemagglutinin (H) and neuraminidase (N). The current subtypes of influenza A viruses found in people are A(H1N1) and A(H3N2). Influenza B virus is not divided into subtypes. Influenza A(H1N1), A(H3N2), and influenza B strains are included in each year's influenza vaccine.

Influenza can be common in birds, though avian influenza viruses do not generally infect people. There are cases of limited human outbreaks, and if the virus were to change into a form that was easily transferred between humans, but so far have not been transmitted from person to person.

**-Tuberculosis.** Tuberculosis is a disease that is spread from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys or the spine. TB germs are put into the air when a person with TB of the lungs or throat coughs or sneezes. When a person inhales air that contains TB germs, he or she may become infected. People with TB infection do not feel sick and do not have any symptoms. However, they may develop TB at some time in the future. The general symptoms of TB include feeling sick or weak, weight loss, fever and night sweats. The symptoms of TB of the lungs include coughing, chest pain and coughing up blood. Other symptoms depend on the part of the body that is affected.

**- 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 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 an asymptomatic or mild infection. Transmission can occur by direct person-to-person contact; through exposure to contaminated water, ice or shellfish harvested from sewage-contaminated water; or from fruits, vegetables, or other foods that are eaten uncooked, and which can become contaminated during harvesting or subsequent handling.

**-West Nile Virus (WNV).** West Nile virus is a mosquito-transmitted virus that can cause encephalitis in some people. This virus usually circulates between mosquitoes and birds in Africa and Europe. However, in 1999, an outbreak of WN encephalitis was reported in New York City. Since then the virus has spread throughout much of the eastern United States, and was found as close as Madison, Wisconsin, and east-central Iowa in 2002.

**- Severe Acute Respiratory Syndrome (SARS).** Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a coronavirus, called SARS-associated

coronavirus (SARS-CoV). SARS was first reported in Asia in February 2003. Over the next few months, the illness spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained.

Source: Centers for Disease Control and Prevention (CDC)

**-Mad Cow Disease.** Bovine Spongiform Encephalopathy (BSE), also known as Mad Cow Disease, is a chronic degenerative disease affecting the nervous system in cattle. It was first diagnosed in Great Britain in 1986. BSE is one of several transmissible spongiform encephalopathies (TSE). On December 23, 2003, a six-year-old Holstein cow in Washington state tested positive for Bovine Spongiform Encephalopathy (BSE). This positive-BSE case is the first in the United States.

**-Hoof and Mouth Disease.** A highly contagious disease almost exclusive to cattle, sheep, swine, goats, and other cloven-hoofed animals. It is caused by a virus that was identified in 1897. Among its symptoms are fever, loss of appetite and weight, and blisters on the mucous membranes, especially those of the mouth, feet, and udder. Discharge from the blisters is heavily infected with the virus, as are saliva, milk, urine, and other secretions. Thus the disease is readily spread by contact; by contaminated food, water, soil, or other materials; or through the air. Humans, who seldom contract the disease, may be carriers, as may rats, dogs, birds, wild animals, and frozen meats. Quarantine, slaughter and complete disposal of infected animals, and disinfection of contaminated material, are prescribed to limit contagion. There is no effective treatment. With vaccines, introduced in 1938, and sanitary controls, foot-and-mouth disease has been excluded or eliminated from North and Central America, Australia and New Zealand, Japan, and Ireland; and occurrences have become infrequent in Great Britain and continental Europe. The disease persists through much of Asia, Africa, and South America.

### **Locations/Jurisdictions Affected:**

**Any and all** jurisdictions within the county can be affected.

#### **♦ History**

However, there have not been many recent events; there have been several instances of infectious diseases that have afflicted residents of Benton County through the years. In 1901, for example, there was a smallpox outbreak in the small community of Duelm. In 1908, the schools closed due to an outbreak of Scarlet Fever. During what is commonly referred to as the “Spanish Flu” influenza pandemic that struck most of the world as World War I came to a close, it is estimated that more than 548,000 people lost their lives to the disease in the United States alone. Benton County was greatly affected. The schools were closed, and there were 175 cases reported in the Foley area alone in October of 1918. Another influenza outbreak occurred in Benton County in early 1919. In 1925, another flu epidemic struck, this time raging through the northern parts of the county. Tuberculosis is another disease that has affected Benton County. The first anti-tuberculosis program began in Benton County in 1911. In 1929, a County-Wide Free Chest Clinic with a tuberculosis expert was arranged to combat the problem. In 1942, all schoolchildren in Benton County were tested for this respiratory disease. Yet another infectious

disease that has affected the county is polio. The Benton County Fair was cancelled in 1946 because of Polio concerns, and Foley closed its public swimming pool because of the disease.

## ❖ Risk Assessment - Infectious Disease / Bio-Terrorism

Infection rates and exposure risk will vary based on the disease, sanitation habits of individuals and personal choices. Large population concentrations and sites with large numbers of people are especially at risk in the event of an outbreak.

**-Effects on people.** Benton County's entire population is susceptible to exposure from an infectious disease because of the random nature of diseases. However, the risk is considered very low throughout the county because of good prevention programs and quality health care. Certain groups of people such as the elderly, the very young, and hospitalized or institutionalized people are at greater risk than the public. Even for these people the risk is considered low to very low. The greatest risk would be in cities, where population density is the highest.

Health care providers, teachers and other public service providers such as police, fire and emergency response personnel also could be affected. Although the risk might be no greater for these groups of people, the impact on the community would be much greater.

**- Effects on residential, commercial, and industrial structures.** Infectious diseases would have virtually no effect on structures. However, an infectious disease outbreak, especially one that occurred over an extended period, could have drastic economic consequences for the region.

**- Effects on infrastructure.** There would be no direct effect on physical infrastructure. However, an infectious disease outbreak may cause wide spread absenteeism throughout the public sector, indirectly affecting infrastructure. An infectious disease outbreak might affect such highly specialized health and non-health sector workers in the police, fire, public works, emergency response, utility, transportation workers. Schools could be closed if a large number of teachers or students were infected.

### Economic Impact on Jurisdictions

The economic impact on an entire jurisdiction for a hazard of this type is hard to calculate, based upon the extent of the disease and how it affects the productivity of the communities it could be devastating.

**- Risk assessment conclusion.** The risks associated with an outbreak of infectious disease is tremendous, particularly given the mobility of the population of the United States, and the world. What could start as a small epidemic could easily become a tremendous problem and spiral even into a worldwide pandemic.

Risk from infectious diseases is low throughout the county, mainly because of good prevention programs and quality health care. However, areas with population densities, like Frostbite Falls, have a slightly higher risk if a disease exists. Frostbite Falls also has several

facilities where an infectious disease outbreak is more likely. These facilities include the regional hospital, a large nursing home and the area high school. In addition, an outbreak might affect specific groups of people more than others including police, fire, public works and emergency response workers.

Livestock populations also are at risk to certain infectious diseases like mad cow and hoof and mouth diseases.

- ◆ **Relationship to Other Hazards – Cascading Effects**

**-Civil Disorder / Rioting.** 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. The difficulties associated with enforcing unpopular but necessary quarantines could also fit into this category.

**- Associated with another disaster.** A disease outbreak can often occur in the aftermath of another emergency.

- ❖ **Plans and Programs**

- ◆ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A13)**

- ◆ **Local Resources**

- 1) **General**

- + **Close proximity to St. Cloud Regional Hospital.** The St. Cloud Regional Hospital sits directly across the Mississippi River from the county, in the city of St. Cloud.

- 2) **Preparedness / Equipment**

- + Benton County Public Health coordinates the local MN Responds Medical Reserve.
    - + Benton County Public Health has stockpiled supplies such as masks and gloves for use in a pandemic.

- 3) **Response Plans**

- + **Emergency Operations Plan.** Benton County currently has an emergency operations plan, known as the Benton County Emergency Operations Plan
    - + Benton County Public Health has a response plan for setting up mass inoculation sites.

- 4) **Plan Exercises**

- + Benton County Public Health exercises their mass inoculation procedures.
    - + Benton County Public Health exercises in conjunction with Emergency Management the ability to request, receive and dispense medical supplies.

- 5) Mitigation Plans / Projects**

- + Increase public awareness through displays and public service announcements.

- 6) Public Awareness**

- + Benton County Public Health as an ongoing public awareness program concerning influenza and coordinates with the County School Districts.

- 7) Training**

- + Benton County Public Health

- 8) Legislation / Codes**

## **9) Funding Sources**

- + Various Health and Emergency Management Grants from HSEM and the Department of Health
- ❖ **Gaps and Deficiencies**

- Some diseases would be overwhelming to health facilities and staff.

## **Hazard: Radon Gas**

### **❖ Hazard Profile**

#### **Radon**

From Wikipedia, the free encyclopedia

**Radon** (pronounced /'reɪdən/, *RAY-don*) is a [chemical element](#) with symbol **Rn** and [atomic number](#) 86. It is a [radioactive](#), colorless, odorless, tasteless [noble gas](#), occurring naturally as the decay product of [radium](#). It is one of the densest substances that remains a [gas](#) under normal conditions and is considered to be a health hazard due to its radioactivity. Its most stable [isotope](#), [<sup>222</sup>Rn](#), has a [half-life](#) of 3.8 days. Due to its intense radioactivity, it has been less well-studied by chemists, but a few compounds are known.

Radon is formed as part of the normal radioactive [decay chain](#) of [uranium](#). Uranium has been around since the earth was formed and its [most common isotope](#) has a very long half-life (4.5 billion years), which is the amount of time required for one-half of uranium to break down. Uranium, radium, and thus radon, will continue to occur for millions of years at about the same concentrations as they do now.<sup>[1]</sup>

Radon is responsible for the majority of the mean public exposure to [ionizing radiation](#). It is often the single largest contributor to an individual's [background radiation](#) dose, and is the most variable from location to location. Radon gas from natural sources can accumulate in buildings, especially in confined areas such as attics, and basements. It can also be found in some [spring waters](#) and hot springs.<sup>[2]</sup> Epidemiological evidence shows a clear link between breathing high concentrations of radon and incidence of lung cancer. Thus, radon is considered a significant contaminant that affects [indoor air quality](#) worldwide. According to the United States Environmental Protection Agency, radon is the second most frequent cause of [lung cancer](#), after cigarette smoking, causing 21,000 lung cancer deaths per year in the [United States](#).<sup>[3]</sup>

#### **Locations/Jurisdictions Affected:**

Any location where there are buildings and the geology that is conducive to radon gas.

#### **❖ History**

Radon is an often-overlooked form of radiation exposure, radon gas is present in many structures.

#### **❖ Risk Assessment - Radon Gas**

- The level of Radon gas in homes and businesses is unknown.
- ♦ Relationship to Other Hazards - Cascading Effects
  - Lung cancer
- ♦ Plans and Programs
  - Increase Public Awareness
- ♦ State and National Resources
- ♦ Local Resources

**1) General**

**2) Preparedness/Equipment**

**3) Response Plans**

**4) Plan Exercises**

**5) Mitigation Plans/Projects**  
Distribution of free/low-cost Radon Gas test kits.

**6) Public Awareness**  
PSA's concerning the danger of Radon Gas

**7) Training**

**8) Legislation/Codes**

**9) Funding Sources**

❖ Gaps and Deficiencies

- Currently there is little being done to promote Radon Gas Awareness.

## Hazard: Hazardous Materials

### ❖ Hazard Profile

Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health of a community. These chemicals are used in industry, agriculture, medicine, research and consumer goods throughout Benton County. Hazardous materials come in the form of explosives, flammable and combustible substances, corrosives, poisons and radioactive materials.

A hazardous material spill or release can pose a risk 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 can be 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.

## **Locations/Jurisdictions Affected:**

Even though a hazardous material spill can occur anywhere the likelihood of it happening increases in areas with heavy commercial traffic by either road or rail. Anhydrous Ammonia spills can occur on any of the many farms within the county; however, their affect would be limited to the immediate farm area.

The jurisdictions with the greatest possibility of occurrence are along the transportation corridors of the county. The Cities included would be **Foley, Gilman, Rice, Sauk Rapids**, Sartell and St. Cloud. The Townships would be Langola, Watab, Sauk Rapids, Minden and Gilmanton. Only Rice, Sartell, Sauk Rapids and St. Cloud have rail traffic. The rail line is BNSF (Burlington Northern Santé Fe) where trains run on the average of one every twenty minutes around the clock.

### **➤ Transportation**

Hazardous materials are conveyed by road, rail, aircraft and pipeline, each presenting differing levels of risk of unwanted release of the hazardous materials. Transported products include hazardous materials moving from producers to users, moving between storage and use facilities, and hazardous waste moving from generators to treatment and disposal facilities.

#### **• By Road.**

The road system in Benton County provides a network to transport both hazardous and non-hazardous material throughout the region and between local communities (**See Map 329, Section VI**). Risks from hazardous materials events 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 the more populated western portions of the county and along state highways. According to the most recent findings at the Minnesota Department of Transportation, more than half of all accidents involving hazardous materials have occurred on the state roadways. Roads are a major concern in Benton County, due to the lack of information available regarding what is traveling on the road system on a daily basis.

#### **• By Rail.**

Rail transportation risks from hazardous materials affect the western section of the county (**See Map 205, Section VI**). Approximately 11 percent of all statewide transportation incidents involving hazardous material in 2002 were from rail transport, according to Mn/DOT statistics. Valve leakage and safety valve releases can be 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.

These leaks can 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 along the Burlington Northern Railroad.

#### **• By Pipeline.**

Benton County has three major pipelines running through it. There are two crude oil pipelines and one natural gas pipeline. The exact locations of these pipelines are on file at the Benton County Emergency Management office, but will not be made available in this plan for security reasons.

- **By Aircraft.**

Hazardous materials are no longer permitted to be transported via aircraft. However, many airplanes require the use of substances that are considered hazardous. Due to the fact that there are no municipal airports in Benton County, the only risk would be from air traffic overhead. The close proximity to the St. Cloud Regional Airport suggests that this should be a concern for the county.

➤ **Fixed Facility** A variety of hazardous materials exists in fixed facilities throughout Benton County. They range from flammable liquids stored or used to fuel vehicles through exotic substances to radioactive materials and biological agents. Some materials are particularly lethal even in small amounts, while others require strong concentrations with prolonged exposure periods to cause harm.

Source: Tier II Facility and Chemical Storage, Report Year 2009

Minnesota Department of Public Safety (MDPS)

Homeland Security & Emergency Management (HSEM)Benton County Emergency Management has access to the following web site <https://erplan.net/eplan/login.htm> that lists all of the hazardous materials and locations for Sara Title III - Tier 2 materials.

- ♦ **History**

Benton County has not experienced a devastating major hazardous materials spill or accident to date. Minor incidents have occurred but these have had little or no impact on the community at large. A notable hazardous material event in Benton County's history was a train derailment that occurred near Parent in April 1920. This incident spilled five tanks of gasoline and six carloads of coal.

The following web sites can be used to find and identify past hazardous spills and current hazardous material facilities.

<http://www.health.state.mn.us/divs/eh/hazardous/surv/index.html>

<http://oaspub.epa.gov/enviro/enviroFACTS.quickstart?minx=-94.13635&miny=45.62700&maxx=-93.86169&maxy=45.77088&cLat=45.69913&cLon=-93.99893&pSearch=benton county, minnesota>

<http://www.homefacts.com/environmentalhazards/Minnesota/Benton-County/Foley.html>

## ❖ Risk Assessment - Hazardous Materials

Varieties of hazardous materials exist as fixed facilities throughout Benton County. They range from flammable liquids stored or used to fuel vehicles through exotic substances to radioactive materials and biological agents. Some materials are particularly lethal even in small amounts, while others require strong concentrations with prolonged exposure periods to cause harm. The specific hazards created by a release are dependent on the hazardous characteristics of the material, the amount released, the location where the release occurs, and the weather and topographic conditions in the area.

**-Effects on people and housing.** The risk of a major event is most severe in the more populated western portions of the county, including St. Cloud and Sauk Rapids.

These cities have a higher population, so any spill would likely have more serious consequences. In addition, people in these areas live in close proximity to the majority of the commercial and industrial facilities within the county, as well as state highways. According to the most recent findings at the Minnesota Department of Transportation, more than half of all accidents involving hazardous materials have occurred on the state roadways. 15 Adult Foster Care providers, 12 Child Foster Care providers, 23 Assisted Living providers, 24 mobile homes, 123 Day Care providers, three nursing homes, nine public schools, and five private schools are all within a half-mile radius of a facility or transportation corridor that poses a risk of hazardous material spills. 7,247 residential addresses are also within this zone.

**- Effects on commercial and industrial structures.** Businesses that use hazardous materials and their surroundings are at an increased risk of a hazardous material incident.

**- Effects on infrastructure.** Rail transportation risks from hazardous materials affect the western half of the county. Approximately 11 percent of all statewide transportation incidents involving hazardous material in 2002 were from rail transport, according to Mn/DOT statistics. Valve leakage and safety valve releases can be 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. These leaks can 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 along the Burlington Northern Santa Fe Railroad.

The road system in Benton County provides a network to transport both hazardous and non-hazardous material throughout the region and between local communities. Risk of hazardous materials events vary based on the classification of the road and its proximity to people and property. However, property directly adjacent to State Highways is more vulnerable due to the sheer volume of traffic on these roadways.

Each of the city halls in the county is within a half-mile radius of a facility or transportation corridor that involves the risk of a hazardous material incident.

## **Economic Impact on Jurisdictions**

The economic impact on an entire jurisdiction can be calculated in dollars by using the current assessed values of buildings within the jurisdiction. To see the assessed values of all buildings within Benton County, which includes townships and cities please refer to *2010 Assessed Property Values for Benton County* at the end of this section.

**- Risk assessment conclusion.** Hazardous materials exist as part of everyday life in Benton 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 the community and prepare an effective response to unwanted releases of hazardous materials when they occur. A hazardous materials accident can occur anywhere at anytime.

The distribution of facilities that store hazardous materials corresponds quite closely to the population distribution of the county. The vast majority of the residents of Benton County live within a mile radius of one of the roads that transport hazardous materials, which crisscross the county. The Burlington Northern Santa Fe Railroad runs parallel to the Mississippi river in the most densely populated western portion of the county.

- ◆ **Relationship to Other Hazards – Cascading Effects**
  - Water contamination.
  - Fire.
- ◆ **Plans and Programs**
- ◆ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A18)**
- ◆ **Local Resources**
  - 1) **General**
    - + **Highways 10 and 23 and the Golden Spike Road are evacuation routes for western portion of Benton County.** If a situation arose that necessitated the quick evacuation of the western portion of Benton County, these routes would be an efficient means to get people out of danger.
    - + **Alert system, radio alerts, EMNS**
  - 2) **Preparedness / Equipment**
    - + **List of residents living within half-mile radius of Hazmat storage, half-mile radius of transport corridor.**
  - 3) **Response Plans**
    - + **Emergency Operations Plan.** Benton County has an emergency operations plan, known as the Benton County Emergency Operations Plan that outlines procedures for dealing with hazardous material accidents, spills or releases (refer to Section 14).
    - + **St. Cloud Regional Hazardous Materials Response Team.**
    - + **FD mutual aid agreements.**
  - 4) **Plan Exercises**
    - + **Water spills, orange drop, computer models (Depiction)**
  - 5) **Mitigation Plans / Projects**

- + Many controlled RR crossings. (BNSF)
- + Stoplights on highway 10. (MNDOT)

## **6) Public Awareness**

- + Placards for transport.

## **7) Training**

- + Refresher training for FD's.
- + Annual Pipeline Safety Training

## **8) Legislation / Codes**

- + Tier II listing.
- + Right to know laws.

## **9) Funding Sources**

### **❖ Gaps and Deficiencies**

- **Highway 10, Railway transport dangerous items.** There are chemicals, weapons, explosives, etc.
- **Tier II constantly changing.** List updated annually, reliant upon self-reporting, in some cases difficult to enforce.
- **Not much community awareness.**
- **Not much funding for FD training.**
- **Sometimes difficult for volunteer FD's to engage in trainings.** Training for volunteer firefighters can be time-consuming, which can be difficult to schedule, as they often have another job.
- **Farmers not trained in chemical use.** In addition, there are no purchase limits for unrestricted chemicals.
- **Rice ballpark, County Fairgrounds, etc. close to transport corridors and Hazmat sites.**
- **County does not know much about city ordinances, plans, or resources.**
- **Lack of security around volatile and dangerous chemical storage.** (Illegal drug components, poisonous substances, or materials with explosive potential)

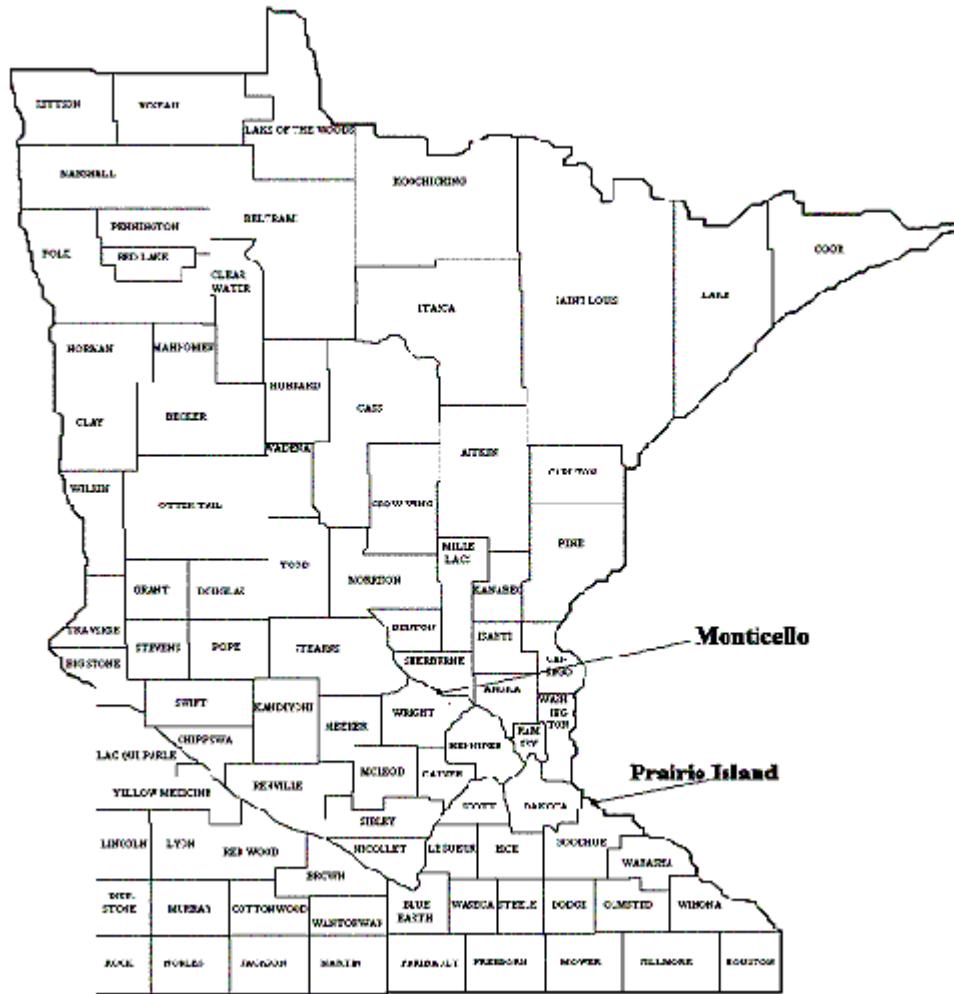
## **Hazard: Radiological Incident**

### **❖ Hazard Profile**

A radiological incident can be defined as unintentional exposure to materials that emit ionizing radiation. The primary radiological hazards are the health effects resulting from unintentional exposure to ionizing radiation. When radiation interacts with atoms, energy is deposited, resulting in "ionization," or electron excitation. This ionization may damage certain critical molecules or structures in a cell. Ionizing radiation is emitted from molecular elements generally referred to as radionuclide, and this radiation has the ability to alter in varying amounts the function of living processes at the cellular level.

Nuclear power plants are a significant potential source of ionizing radiation. The health and environmental impacts from the Three-Mile Island and the Chernobyl, Russia disasters illustrate the potential hazards from nuclear power plants. Other sources of ionizing radiation include medical and diagnostic X-ray machines, certain surveying instruments, some imaging systems used to check pipelines, radioactive sources used to calibrate radiation detection instruments, and even some household fire detectors.

Source: Minnesota Hazard Mitigation Plan



### Locations/Jurisdictions Affected:

Any affect from a radiological incident involving the closest nuclear plant to Benton County would be due to the population fleeing the immediate area of the incident. State highway 95, which runs through the southern part of Benton County, would see increased traffic if people follow the designated evacuation route. The areas affected would be **St. George** and **Glendorado Townships**.

#### ♦ History

There have been no known radiological incidents in Benton County.

## ❖ Risk Assessment - Radiological Incident

- **Effects on agriculture.** Benton County is within the “plume zone” of the Monticello Nuclear Power Plant. Agriculture, both livestock and crops, would be primarily affected.
- **Effects on people and housing.** With sufficient warning, the residents of Benton County would be able to shelter in place and would not be exposed to extreme danger in the event of a radiological incident at the Monticello Nuclear Power Plant.
- **Impacts on future development.**

### **Economic Impact on Jurisdictions**

The economic impact is difficult to assess for this type of incident. In the case of a mass exodus or people from Wright and Sherburne counties, it could actually be an economic boom due to increased business from the additional people flowing into the county.

At the same time, it could be a strain on local public services. Another possibility could be potential contamination of any crop in the southern portion of the county. Even a perceived notion by the public that any crop near the site of an incident would be unsafe to consume would have a huge economic impact on Benton County.

To see the assessed values of all buildings within Benton County, which includes townships and cities please refer to *2010 Assessed Property Values for Benton County* at the end of this section.

### **- Risk assessment conclusion.**

Little direct effect would be experienced, however the indirect effects could be considerable.

## ❖ Relationship to Other Hazards – Cascading Effects

- **Food safety.**
- **Civil Unrest / Rioting.**

## ❖ Plans and Programs

### ❖ State and National Resources (See **2008 Minnesota Hazard Mitigation Plan: A16**)

### ❖ Local Resources

#### **1) General**

#### **2) Preparedness / Equipment**

#### **3) Response Plans**

- + **St. Cloud Hazardous Materials Response Team.** This team has trained radiological

response technicians.

- + **Monticello Emergency Plan.** The nuclear power plant located in nearby Monticello, Minnesota has an emergency plan in place.

#### **4) Plan Exercises**

- + Local County surrounding the Monticello Nuclear Plant have participated with the State of Minnesota's Department of Homeland Security and Emergency Management in exercises of the State Response Plan.

#### **5) Mitigation Plans / Projects**

- + Benton County Emergency Operations Plan contains an evacuation plan for moving people out of the affected zone.

#### **6) Public Awareness**

- + PSA's are used to educate local residents

#### **7) Training**

- + Training is done in conjunction with all related organizations concerned with a nuclear plant incident in Monticello through the exercise of their response plans.

#### **8) Legislation / Codes**

#### **9) Funding Sources**

#### **❖ Gaps and Deficiencies**

### **Hazard: Water Supply Contamination or Other Loss of Water**

#### **❖ Hazard Profile**

Water supply contamination is the introduction of point and non-point source pollutants into public ground water, public or private wells (**See Maps 266-286, Section VI**), and/or surface water supplies. Although minimal, water supply contamination does pose a threat in the county.

Microbiological and chemical contaminants can enter water supplies. Chemicals can leach through soils from leaking underground storage tanks, feedlots (**See Maps 245-265, Section VI**) and waste disposal sites (**See Maps 350-370, Section VI**). Human wastes and pesticides can also be carried to lakes and streams during heavy rains or snow melt.

#### **Locations/Jurisdictions Affected:**

**All areas and jurisdictions** within Benton County are at risk. Those areas that are most affected by hazardous spills would also be at greater risk for a spill contaminating their water supply.

#### **❖ History**

Drinking water in Benton County comes from ground water. The most significant geological condition in Benton County is the large sand plain region located along the West and Southern border of the County. In this area, ground waters are well connected with surface waters and the

land surface, and are prone to contamination from activities occurring at the surface. Land use in the sand plain area is agricultural and residential. Intensive irrigation and development have resulted in land use conflicts in isolated areas.

Benton County Soil and Water Conservation District (SWCD) offers free nitrate-nitrogen screening to anyone in the County as a public service.

The Public Health Department also provides well testing services for a variety of possible contaminants. Municipal wells are also tested in Benton County by the Minnesota Department of Health (MDH). Generally municipal wells have had good water quality. Municipal wells tested by MDH in the county are East St. Cloud, Sauk Rapids, Sartell, Rice and Foley. The MDH tests municipal wells for coliform bacteria, nitrates, inorganic chemicals and volatile organic chemicals (VOC's). There has been only one case where a well has been shut down because of excessive VOC's. This well is located in the City of Rice and was shut down in late 1989. In March of 1993, a new city well was installed. The well, which contains VOC's, is still in use, however, well water is diluted before it is used for consumption and meets all safe drinking water standards.

Unused, unsealed wells also threaten the water quality in the county. It is estimated that there are between 2000 and 4000 unused, unsealed wells in the county. This is based on the number of homesteads located in the county before drilling wells became more common.

Many of these wells are dug and act as direct conduits for surface water to enter ground water aquifers. These dug wells not only threaten water quality but also in some cases are extremely dangerous to livestock, pets and humans.

Generally, the soils adequately protect ground water from surface runoff; as a result, it is important to identify and seal as many high priority unused, unsealed wells in the county as possible.

High priority wells are multi-aquifer wells and wells located where the geology is not the problem. To date the county has done extensive education on the importance of sealing unused, unsealed wells; has conducted an abandoned well inventory; and has encouraged the state to develop a cost-share program to assist landowners with well sealing costs.

It would be impractical to list all of the identified unused, unsealed wells in the county; however the information is available at the Soil and Water Conservation District (SWCD) office. The SWCD office has an inventory of 1265 unused, unsealed well sites on file. Continuing education and cost-sharing will be an important water pollution management tool in the county.

To date, there is little enforcement on feedlots which surface and ground water (**See Maps 245-265, Section VI**). Most landowners contact the Soil and Water Conservation District or Natural Resources Conservation Service when installing livestock waste pollution abatement systems. These systems are primarily installed for the landowner's convenience. If the county is to effectively preserve and protect its water resources, feedlots need to be targeted.

One way in which the county could better monitor feedlots would be to adopt the state feedlot jurisdiction from the MPCA and charge permit fees to cover the costs of a "feedlot officer." This feedlot officer would be able to monitor feedlots within the County and identify high priority lots needing attention.

Source: Benton County Comprehensive Local Water Use Plan

### **Economic Impact on Jurisdictions**

The economic impact would vary from city to city and from township to township based upon their readiness to supply clean water. Individual businesses, homes and organizations are more likely to be impacted. For example nursing homes need a large amount of water to sustain their operation on a daily basis, if they are unable to do so they would have to transfer clients to other facilities. This could have a cascading effect economically for the jurisdiction where it is located. Sartell, Sauk Rapids, Foley and St. Cloud all have nursing homes.

#### **♦ Relationships with Other Hazards – Cascading Effects**

**- Infectious diseases.** Polluted human water sources can cause illness and epidemics in both humans and animals.

- ❖ Plans and Programs
- ♦ **State and National Resources (See 2008 Minnesota Hazard Mitigation Plan: A19)**
- ♦ **Local Resources**

#### **1) General**

+ **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. Also, the EPA requires all local suppliers to promptly inform the public if their supply becomes contaminated.

#### **2) Preparations / Equipment**

#### **3) Response Plans**

#### **4) Plan Exercises**

#### **5) Mitigation Plans / Projects**

#### **6) Public Awareness**

#### **7) Training**

#### **8) Legislation / Codes**

+ **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 these federal drinking water standards, or more stringent ones established by the state, are met by each public water supplier.

#### **9) Funding Sources**

## **Jurisdictional Hazard Summary**

The following summary lists which hazards each jurisdiction faces

<b>Jurisdiction</b>	<b>Hazard</b>	<b>Special Considerations</b>
Benton County - includes all townships.	All Hazards Listed	Flooding at Little Rock Lake is a constant use of resources.
City of Foley	All Hazards except radiological incident, and wildfire.	Limited Flooding, pipeline-pumping station exists within the city limits. Intersection of two state highways (25&23) is within the city limits.
City of Gilman	All Hazards except flooding, radiological incident, and wildfire	Biggest concern is summer storms,
City of Rice	All Hazards except flooding, radiological incident, and wildfire.	BNSF rail runs directly through the center of town. US highway 10, a major traffic corridor for the State runs through the eastern side of the city.
City of Sauk Rapids	All Hazards Listed except wildfire.	BNSF rail runs the entire length of the town on its western border. US highway 10 runs the entire length of the town on its eastern border. Sauk Rapids is the largest city in Benton County.

## 2010 Assessed Property Values for Benton County

<b>City Jurisdiction</b>	<b>Building Market</b> value (does not include land or other taxable property)
Foley	150,300,600
Gilman	12,479,500
Rice	80,242,400
Sauk Rapids	645,661,300
Sartell	90,450,900
St. Cloud	242,202,900
<b>Township Jurisdiction</b>	<b>Building Market Value</b>
Alberta	32,136,900
Gilmanton	40,157,700
Glendorado	38,133,200
Graham	28,024,000
Granite Ledge	30,150,400
Langola	55,786,600
Mayhew Lake	41,843,600
Maywood	40,375,700
Minden	111,183,200
St. George	61,194,100
Sauk Rapids	29,580,000
Watab	149,079,100
<b>All Jurisdictions</b>	<b>Total Building Value</b>
City & Township	1,890,982,100