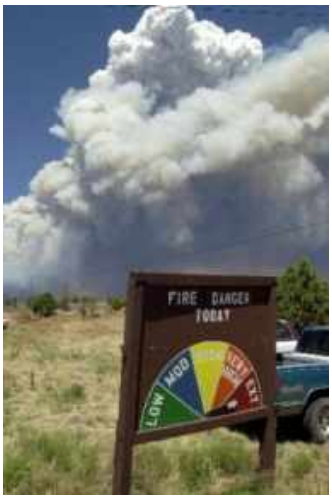
PART FOUR: SECONDARY NATURAL HAZARDS

The following hazards are possible, but have not been prioritized among the top three natural hazards in Le Sueur County; they will be summarized accordingly.

WILDFIRE

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 dangers from wildfire include 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.

Wildfire is a naturally occurring part of the environment. While we often think of wildfires as being "bad", it is just one way of nature eliminating dead vegetation – sort of an environmental house cleaning. However, as humans settled this country and began clearing land and building homes, roads, railroads, and campgrounds, new artificial causes of wildfire arrived on the scene.

As mentioned earlier, people burning debris cause most wildfires in Minnesota. However, wildfires are also caused by vehicle exhaust, sparks from trains and heavy equipment, camping, smoking, and lightning.

Causes of wildfires will vary from state to state. For example, in Florida, lightning ignites approximately half of all wildfires, while in Minnesota lightning causes less than 5 percent of all wildfires. These variations are due to climate, vegetation, topography, and weather.

Topography affects the movement of air and fire over the ground surface. The slope and shape of terrain can change the rate of speed at which the fire travels. Weather affects the probability of wildfire and has a significant effect on its behavior. Temperature, humidity and wind affect the severity and duration of wildfires.

Homes threatened by wildfire are primarily those located in the "wildland-urban interface". This is the zone where homes and subdivisions have been located in wildland areas where natural wildfires can have an impact. While wildfires in themselves are not bad, they burn whatever fuel is in their path, whether it is vegetation or buildings.

Wildfire can destroy or damage a home in many ways although applying simple practices can protect any home.

One of the most common causes of a home being damaged or destroyed is due to radiant heat. In a wildfire, radiant heat is the heat given off by burning vegetation. The high temperatures of some wildfires can cause the deck, siding or roof of a home to ignite, just because the fire was too near the home. Especially in areas of solid conifers (pines, spruces, junipers, and other conifers), radiant heat can be very hot. Studies have shown that when solid stands of conifers exist, a minimum of 30 feet of "defensible space" should be provided between the vegetation and the home. Studies in western wildfires have shown that approximately 85 percent of those homes

surviving a major wildfire had 30-50 feet of defensible space around the home, coupled with fire-resistant roofing.

Wildfire has not been identified as a priority because there has not been an occurrence of wildfire reported in Le Sueur County over the past 50 years.

Le Sueur County Wildfire Hazard Risk Assessment

Hazard:	**Wildfire**
Location	Countywide, particularly in dry natural areas with lots of vegetation
Historic Events	None on Record
Likely to happen now?	Unlikely
How often?	Very infrequently
Where would event occur?	Natural areas with high amounts of vegetation
Severity of event?	Not likely to be severe
When would hazard likely occur?	Spring/Summer
What other hazards could occur at the same time?	Structural fire if wildfire moves into populated areas
Economic impacts	Could be significant, particularly if damage to agricultural operations occurs
Loss of life impacts	Not likely to occur
Risk Level VH – Very High H – High L – Limited M – Minimal	Citizens/People: M Animals/Livestock: M Housing: L Critical Structures: M Infrastructure: M **Total:** M
Risk Assessment	
Unlikely – 1 Occasional – 2 Likely – 3 Highly Likely – 4	**Frequency of Occurrence** 1
More than 12 hours – 1 6-12 hours – 2 3-6 hours – 3 Minimal-None – 4	**Warning Time** 1
Limited – 1 Minor – 2 Major – 3 Substantial – 4	**Potential Severity** 2
Minimal – 1 Limited – 2 High – 3 Very High – 4	**Risk Level** 1
(Total divided by 4) **Very Low – 1** **Low – 2** **Moderate – 3** **High – 4**	**Overall Priority** **1.25** **Very Low**

Vulnerability to Wildfire

Minnesota has about 2,200 wildfires every year. Wildfires occur throughout the spring, summer and fall, however, most wildfires in Minnesota take place in March, April, and May. During this period, much of the existing vegetation has been killed due to winter temperatures and most of the vegetation is dead, brown and combustible. Also, there is little green vegetation to serve as a barrier for a moving wildfire.

Although wildfires could occur anywhere throughout Le Sueur County, there are several areas with steeper slopes and suitable vegetation pose a higher risk potential. While the probability of a wildfire occurring in these areas is greater, there still is a relatively low concern because of the sparse population and lack of infrastructure. With no documented wildfire history, the probability would be quite low for an occurrence but could escalate if climatic conditions create an ideal dry environment. Larger cities, with higher populations, larger housing stocks and essential utilities, are less likely to be impacted seriously by a wildfire, since they also have a adequate fire department facilities. These facilities would minimize any damages caused by wildfires before they reach the city.

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Why Are We Worried about Fire?

Fire is a natural part of our environment. Our forests and prairies were burning long before our cities and towns existed.	+	People are living in the fire environment. Many homes are built and maintained without regard to wildfire.	+	With more people using our wildlands, more human-caused fire ignitions are likely	+	Today's wildfires can burn intensely and be difficult to control.	=	**Greater loss of life. Increased property damage. Damage to natural resources. More money spent on firefighting.**

History of Wildfire

Wildfires occur throughout Minnesota. According to the Minnesota State Fire Marshal, there are more than 2,200 annual wildfires with an estimated loss of more than $13 million dollars. There are no wildfires on record for Le Sueur County with the National Climatic Data Center (NCDC) between the years of 1950 and 2006.

Region Nine staff has researched wildfire events in Le Sueur County extensively during the development of this document, and has been in contact with county officials, the State of Minnesota Fire Marshall's office, and several online government databases. None of these sources were able to turn up any officially reported wildfire events. It is possible, and indeed likely, that there have been and will continue to be small wildfire events such as grass fires, but due to the relatively small impact these have events may have had to date and the efficiency with which such events are resolved by local firefighting personnel, wildfire has been deemed to be a low-priority hazard for Le Sueur County.

Potential Impacts and Cascading Effects

The most significant impacts from wildfire are the economic impacts that can be caused by damage to natural resources or agricultural areas, as well as damages incurred to buildings or infrastructure that may be in the path and affected by wildfire. Likewise, as is the case with all fires, wildfire also poses a threat to human life and safety, particularly for those who are dispatched to contain it (firefighters).

Wildfire Gaps and Deficiencies

- Some fire departments within the county may not have the adequate equipment (such as off-road grass rigs) to property fight a wildfire.

- Since there are state-owned lands within Le Sueur County, the issue of who is responsible for clearing debris to prevent a wildfire, or fighting a wildfire should one occur, must be clarified.

ACTIONABLE MITIGATION STEPS:

Actionable Mitigation Steps are more elaborately explained with project, timeframe, responsible jurisdictions/staff, possible funding sources, and priority level in the Action Plan section of this document. Suggested areas of focus are denoted in parentheses.

1. Proper Equipment (Countywide) – Wildfires often occur on rough terrain and in fairly remote locations, and many Le Sueur County fire departments are not adequately equipped with the off-road capabilities (such as grass rigs) to properly deal with wildfire occurrences. Those jurisdictions that do not have their own wildfire equipment may want to make arrangements with nearby departments that do so they are prepared for a wildfire occurrence.

2. DNR Training (Countywide) – Encourage fire department participation in annual wildfire training classes that are offered by the Minnesota Department of Natural Resources Forestry Department. Participation in any other relevant training exercises is also recommended.

3. Participation in FireWise (Countywide) – The DNR participates in a national wildfire education program that is known as FireWise, which provides tools for risk assessment/reduction for interested communities. Some small grants may be available to offset the costs of participation in the program.

4. State Land Management (Countywide) – The DNR is responsible for regulating and operating all state lands within Le Sueur County. Thinning brush and vegetation in the areas before they reach a point where they are likely to be a wildfire hazard can minimize wildfires in state-owned areas. Clarification of who is responsible for dealing with wildfires on state-owned land (i.e. local city departments or state/DNR teams) should also be addressed.

5. Zoning (Countywide) – Le Sueur County, as well as city staff in individual communities, should review zoning ordinances to ensure that adequate distances (setbacks) are being maintained between structures and areas that may be prone to wildfire.

6. Fire Districts, Departments (Countywide) – Fire departments respond to any wildfires that are in their own fire district, and are also available to assist other departments or districts in the event of a large fire.

7. Evacuation Plan (Countywide) – Cities should maintain a plan describing and depicting routes out of the community in the event of a large fire that poses an imminent threat to the community.

EXTREME TEMPERATURES

Located in the center of the continent, Minnesota and Le Sueur County experience the extremes of summer heat and winter cold. Summer temperatures in Le Sueur County have reached 109° F on occasions while winter temperatures have been as cold as 36° below zero. Both heat and cold pose risks for people, animals, equipment and infrastructure. Le Sueur County has experienced (5) reports of extreme heat related events in the past 50 years, while four (4) occurrences of extreme cold have been reported.

Extreme Heat - In recent years a heat index has been developed that combines humidity and temperature to better reflect the risk of warm weather to animals and people. The index measures the apparent temperature in the shade. People exposed to the sun would experience an even higher apparent temperature. A heat index of 105 is considered dangerous. With prolonged exposure it could result in heat stroke, heat exhaustion and heat cramps. People are reminded to use extreme caution when the heat index is between 95 and 105. A heat index of 95 occurs when the temperature is 90 degrees and the relative humidity is 50 percent. Le Sueur County can expect these kinds of conditions on 8 to 10 days each summer. This is more of a problem when these conditions are present for several days in a row. This allows buildings to become hotter and hotter as the conditions persist.

HEAT INDEX	Affects on the Human Body
130 or above	Heat stroke highly likely with continued exposure
105 to 130	Heat stroke likely with prolonged exposure
90 to 105	Heat stroke possible with prolonged exposure

Extreme Cold - Dangerously cold weather is that which produces relatively cold temperatures with strong winds, creating low wind chills that put both people and livestock at risk. Wind chills of -19 and lower can present significant risk, particularly if people are not properly clothed or protected. A 5° F air temperature with wind speeds of 30 mile per hour creates a wind chill of 19° below zero. In the open under these conditions, frostbite will occur in 15 minutes or less on exposed skin.

New Wind Chill Chart

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

Frostbite occurs in 15 minutes or less

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

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

Vulnerability to Extreme Temperatures

While summers are typically warm but pleasant in Le Sueur County, it is not uncommon to get extended warm spells with high dew points and temperatures in the 90's for several days in a row. Extended periods of warm, humid weather can create significant risks for people, particularly the elderly who may lack air conditioning or proper insulation or ventilation in their homes. Animals are also at risk during extended periods of heat and humidity.

According to the State Climatologist, there is some evidence that current dew points are not only higher but are occurring with greater frequency than was true in the past. If that is the case, Le Sueur County residents can expect an increasing number of hours with heat indexes in the danger category.

Le Sueur County Extreme Temperature Risk Assessment

Hazard:	**Extreme Temperature**
Location	Countywide
Historic Events	Record high of 109 degrees Fahrenheit, record low of –36 degrees Fahrenheit
Likely to happen now?	Yes
How often?	Extreme heat (heat index 95 degrees or above) 8-10 days per year, one day over 100 degrees every 2 years, extreme cold 2-3 days per year
Where would event occur?	Anywhere in County
Severity of event?	Depends on temperatures and duration
When would hazard likely occur?	Winter/Summer
What other hazards could occur at the same time?	Utility failure (water/wastewater plants, power outages) due to increased demand on system
Economic impacts	Crops/agricultural losses during extreme heat
Loss of life impacts	Potential due to hypothermia or heatstroke
Risk Level VH – Very High H – High L – Limited M – Minimal	Citizens/People: L Animals/Livestock: L Housing: M Critical Structures: M Infrastructure: M **Total:** M/L
Risk Assessment	
Unlikely – 1 Occasional – 2 Likely – 3 Highly Likely – 4	**Frequency of Occurrence** 2
More than 12 hours – 1 6-12 hours – 2 3-6 hours – 3 Minimal-None – 4	**Warning Time** 2
Limited – 1 Minor – 2 Major – 3 Substantial – 4	**Potential Severity** 1
Minimal – 1 Limited – 2 High – 3 Very High – 4	**Risk Level** 1
(Total divided by 4) **Very Low – 1** **Low – 2** **Moderate – 3** **High – 4**	**Overall Priority** 1.5 Very Low/Low

Statewide History of Extreme Temperatures

Extreme Heat

A heat wave began on July 30th of 2001 and persisted until August 1 of that summer. Temperatures on July 30th soared into the upper 80's and lower 90's across a large portion of central and southern Minnesota, while dew points climbed into the middle 70's to lower 80's, resulting in triple digit heat indexes during the afternoon and evening. A noteworthy index included 111 in Mankato. During the early morning hours of the 31st, dew points remained in the 70's, therefore nighttime heat indexes only dropped to the upper 70's and lower 80's. In fact, from 1000 CST July 30 to 1600 CST July 31 inclusive, Minneapolis-St. Paul (MSP) set a record with 31 consecutive hours during which the dew point was equal to or greater than 74 (the previous record was 25 hours in July 1977). On July 31 temperatures climbed slightly higher while dew points remained in the middle 70's to lower 80's. Heat index values reached triple digits prior to noon in most areas. The heat wave expanded eastward into Wisconsin on the 31st and continued into August 1 over both Minnesota and Wisconsin. Korey Stringer, a professional football player for the Minnesota Vikings of the NFL, practiced during the late morning of the 31st in Mankato. He collapsed shortly after practice and was taken to the hospital. Mr. Stringer died on August 1, 2001.

The average high temperature in July is about 83° F. July is the warmest month. On average the county experiences 22 days of 90 degree temperatures or higher during a summer. The all time high is 109° F, which occurred in July of 1936. On average, Le Sueur County can expect at least one day over 100° F about every two years.

Extreme Cold

Extreme cold temperatures also affect the county nearly every year. Extremely cold air settled over the area on January 31st of 1996, and remained entrenched through February 4th. A new record low temperature for Minnesota was set in the town of Tower on February 2, 1996. Numerous record low temperatures were set during the period at St. Cloud, Rochester and the Twin Cities. Minneapolis/St. Paul set three new record low temperatures as well as recording the second coldest day on record on February 2, 1996. A mean temperature of 25 degrees below zero was measured that day with a high of 17 below and a low of 32 degrees below zero in the Twin Cities. This was within two degrees of tying the all-time record low temperature set in the Twin Cities and the coldest temperature recorded this century. Many central and southern Minnesota locations set new record low temperatures the morning of the 2nd. The governor closed all schools that day.

On average, January is the coldest month, with daytime highs of averaging 20°F and nighttime lows of 2°F. However, these averages really do not tell the whole story. Maximum temperatures in January have been as high as 61°F and minimums as low as 36° below zero.

Potential Impacts and Cascading Effects

The most pressing threat from extreme temperature is the impact on human life and safety. Extreme temperatures make many people more prone to suffering the effects of heat stroke or exhaustion in extreme heat, or frostbite and hypothermia for extreme cold. This is particularly important for those who have jobs that require that they be outside and exposed to the elements.

Some economic impacts may be involved as well if businesses or government institutions close to ensure the public safety, or as farmers may lose some livestock due to temperature extremes. In addition, dry, hot conditions that occur for a prolonged amount of time can phase into a drought as well as increasing the risk of wildfires. Increased demand on electricity providers (for heating and air conditioning) can also lead to power outages.

Extreme Temperature Gaps and Deficiencies

- Local radio, television, and print media provide information on current heat and cold advisories, but they are effective only if paid attention to. Since broadcasts are nearly entirely in English, language barriers may exist for non-English speaking residents.

ACTIONABLE MITIGATION STEPS:

Actionable Mitigation Steps are more elaborately explained with project, timeframe, responsible jurisdictions/staff, possible funding sources, and priority level in the Action Plan section of this document. Suggested areas of focus are denoted in parentheses.

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

2. Wind Chill Warnings (Countywide). The local radio and TV media in concert with the National Weather Service issues a wind chill warning when temperatures are 30 ^{o} F or lower. Severe wind chill warnings are provided when conditions warrant and when severe risk and safety is a factor. Wind chills of 40 ^{o} F below or lower frequently prompt the closing of schools to protect children, particularly in rural areas.

3. School Closings (Countywide) – Le Sueur County school districts may close schools in instances of extreme temperatures to ensure the safety of students and staff. This is generally more likely to occur during times of extreme cold, since many schools are not in session during the summer months when extreme heat events are prone to occurring. School closures should be publicly announced through local radio and television stations.

DROUGHT

Climatologists define drought as a period of abnormally dry and/or unusually hot weather sufficiently prolonged for the corresponding deficiency of water to cause a "serious hydrologic imbalance". More simply put, too dry and/or too hot for too long. Interpreting what is "too dry" or what is "too long" is difficult. What we do know is that when a serious hydrologic imbalance occurs in Minnesota, soil moisture reserves, groundwater supplies, lake levels and stream flows are negatively influenced. Water-dependent industries including agriculture, public utilities, forestry, and tourism are profoundly affected. Although droughts are not as sudden as floods, the economic aspects of droughts can be just as significant.

An emerging useful tool in drought mitigation is the Palmer Index. Wayne Palmer developed the Palmer Index in the 1960s, and it uses temperature and rainfall information in a formula to determine dryness. It has become the semi-official drought index.

The Palmer Index is most effective in determining long-term drought—a matter of several months—and is not as good with short-term forecasts (a matter of weeks). It uses a 0 as normal, and drought is shown in terms of minus numbers; for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought.

Le Sueur County Drought Hazard Risk Assessment

Hazard:	**Drought**
Location	Countywide
Historic Events	Drought of 1988, less severe drought in 2003
Likely to happen now?	Unlikely
How often?	Significant drought once per 20-30 years
Where would event occur?	Anywhere in County
Severity of event?	---
When would hazard likely occur?	Summer
What other hazards could occur at the same time?	Utility failure (water/wastewater plants) due to increased demand on system, possible instances of extreme heat
Economic impacts	Crops/agricultural losses
Loss of life impacts	Unlikely
Risk Level VH – Very High H – High L – Limited M – Minimal	Citizens/People: M Animals/Livestock: L Housing: M Critical Structures: M Infrastructure: M **Total:** M
Risk Assessment	
Unlikely – 1 Occasional – 2 Likely – 3 Highly Likely – 4	**Frequency of Occurrence** 1
More than 12 hours – 1 6-12 hours – 2 3-6 hours – 3	**Warning Time** 1

Minimal-None – 4	
Limited – 1 Minor – 2 Major – 3 Substantial – 4	**Potential Severity** 2
Minimal – 1 Limited – 2 High – 3 Very High – 4	**Risk Level** 1
(Total divided by 4) **Very Low – 1** **Low – 2** **Moderate – 3** **High – 4**	**Overall Priority** 1.25 Very Low

Vulnerability to Drought

Because long-term climate variations are unpredictable, drought is largely unpredictable, but it is always wise to plan ahead in the event of a drought. Once we find ourselves in a drought, we do not know whether it is the 6th month of an 8-month drought or the 6th month of an 8-year drought!

History of Drought

On November 5, 2003 the U.S. Department of Agriculture designated 62 counties in Minnesota as primary agricultural disaster areas. The counties were declared due to losses caused by a drought that occurred from July 1, 2003, and continuing. Le Sueur County was eligible because the area was contiguous.

Another significant drought occurred in the Le Sueur County area between 1987 and 1989. The warm, dry winter of 1986-87 was the beginning of this drought period. Drought conditions became very serious in mid-June 1988 when Mississippi River flow levels threatened to drop below the Minneapolis Water Works intake pipes at Fridley. Below normal precipitation coupled with declining lake levels, ground water levels, and stream flow created statewide concern. To facilitate coordination of drought response actions a State Drought Task Force was convened by the Director of the Division of Waters. The State Drought Task Force brought together local, state, and federal officials to share information and coordinate drought response strategies. Several actions were taken following the summer of 1988 to better prepare the state for the next drought. The Governor appointed a "Twin Cities Water Supply Task Force" specifically to make recommendations on how to meet future water demands in the event of low flow conditions on the Mississippi River. The US Corps of Engineers initiated review of its operating plans for the Mississippi River headwaters reservoirs, and the 1989 legislature charged the Metropolitan Council with preparing water use and supply plans for the metropolitan area. In the summer of 1988, rains finally came in August, but not soon enough to save agriculture crops. Drought also gives way to insect infestation. Grasshoppers were well known during the 1988 drought.

Potential Impacts and Cascading Effects

Because of the low risk of droughts an occurrence may not have a severe impact on human life due to means of accessing water; however the economic impact on farmers would be significant. A drought would have a detrimental economic impact on the local economy due to stunting growth of agriculture crops and possible negative impacts on livestock as well. Extended drought conditions may also make an area more prone to occurrences of wildfire. Droughts can also be closely linked with insect infestation. Trees may be lost due to lack of moisture. In severe instances, a drought may cause Le Sueur county wells to dry up entirely.

Drought Gaps and Deficiencies

- Some communities have yet to enact wellhead protection measures, and have identified these areas as points of concern.

- Since droughts are so rare, communities may not be familiar with enacting and enforcing water restrictions on their residents.

ACTIONABLE MITIGATION STEPS:

Actionable Mitigation Steps are more elaborately explained with project, timeframe, responsible jurisdictions/staff, possible funding sources, and priority level in the Action Plan section of this document. Suggested areas of focus are denoted in parentheses.

1. Utilization of Water Conservation Strategies (Countywide) – Water conservation provisions and use restrictions in times of drought are generally included in city ordinances. Staff of all Le Sueur County cities are encouraged to periodically review these ordinances and enact them when deemed necessary.

2. Water Access (Countywide) – The County and city members of the hazard mitigation task force would work cooperatively to identify water access points should a drought occur for human and animal consumption.

INFECTIOUS DISEASE

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 child care practices, as well as increasing poverty, have a role in emerging infections.

The primary infectious diseases identified by the Le Sueur County Health Department include the following:

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.

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.

Le Sueur County Infectious Disease Hazard Assessment

Hazard:	**All Infectious Diseases**
Location	Countywide
Historic Events	Very limited instances of diseases over the past 50 years
Likely to happen now?	Unlikely
How often?	Infrequently
Where would event occur?	Any area within Le Sueur County, though likely to affect certain groups of people most vulnerable (the very young or the elderly, for example)
Severity of event?	Could be a major outbreak of life-threatening disease in a worst-case scenario
When would hazard likely occur?	Any time of year
What other hazards could occur at the same time?	Widespread panic, riots, natural hazard events
Economic impacts	Loss or reduction of local business, costs incurred to deal with outbreak (medical personnel, medicine/vaccines, facilities)
Loss of life impacts	Potentially major if a large-scale outbreak occurs
Risk Level VH – Very High H – High L – Limited M – Minimal	Citizens/People: VH Animals/Livestock: VH Housing: M Critical Structures: M Infrastructure: M **Total: H**
Risk Assessment	
Unlikely – 1 Occasional – 2 Likely – 3 Highly Likely – 4	**Frequency of Occurrence** 1
More than 12 hours – 1 6-12 hours – 2 3-6 hours – 3 Minimal-None – 4	**Warning Time** 1
Limited – 1 Minor – 2 Major – 3 Substantial – 4	**Potential Severity** 4
Minimal – 1 Limited – 2 High – 3 Very High – 4	**Risk Level** 2
(Total divided by 4) **Very Low – 1** **Low – 2** **Moderate – 3** **High – 4**	**Overall Priority** 2 Low

Vulnerability to Infectious Disease

Infectious diseases are always a risk for Le Sueur County, and must be taken into serious consideration to assist in mitigating their effects to a minimum if and when they do occur. Many infectious diseases are preventable and are controllable, limiting the vulnerability of Le Sueur County to an epidemic so long as measures are taken. 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.

History of Infectious Disease

Minnesota has not had an infectious disease outbreak reach epidemic proportions in decades. Le Sueur County experienced individual cases of infectious diseases over the last 50 years that have been considered isolated occurrences or minor exposures.

Potential Impacts and Cascading Effects

Instances of an infectious disease can have very severe impacts in a worst-case scenario, including the possibility of a large loss of life. Infectious disease can also lead to long-term sickness and bodily impairment/disabilities as well. An outbreak or epidemic could feasibly impact the ability of resources, such as medical facilities, to meet the increased demand for services. Additionally, since southern Minnesota's economy is heavily impacted by the animal/livestock industry (which can be susceptible to infectious disease as well), implications of such an outbreak can negatively affect the local economy. In the event of a large-scale epidemic, deaths, fears, and misinformation could also trigger public panic, lawlessness, and riots.

Infectious Disease Gaps and Deficiencies

There have been not been any program gaps or deficiencies regarding the possibility of an infectious disease hazard event identified.

ACTIONABLE MITIGATION STEPS:

Actionable Mitigation Steps are more elaborately explained with project, timeframe, responsible jurisdictions/staff, possible funding sources, and priority level in the Action Plan section of this document. Suggested areas of focus are denoted in parentheses.

1. Safe Animal/Livestock Handling Processes and Facility Structure (Countywide) - Through zoning and inspections animal operations can be properly design and maintain that reduce risks of disease among livestock, which ultimately impact humans.

2. Media Outreach (Countywide) – In the event of an infectious disease outbreak, local radio, television, and print media should be utilized to ensure that proper and factual information regarding the disease event is being disseminated throughout Le Sueur County communities. This may assist in calming fears that may lead to negative secondary effects, as described earlier.

3. Health Education for Youth and Parents (Countywide) – The County and school public health nurses can provide educational material to young adults and parents on the impact of infectious diseases.

4. Health Education to Private Businesses (Countywide) – The county public health department will provide educational material, as well as, periodic site visits to aide food establishments in being educated on safe food handling processes.

5. Cooperation with State Health Department (Countywide) – Le Sueur County clinics and hospitals will continue to cooperate and share information regarding infectious disease occurrences with the Minnesota State Health Department, and information flow between the two will assist in alerting Le Sueur County agencies to the possibility of an outbreak event.

6. Participation in Vaccination Programs (Countywide) - All Le Sueur County residents (particularly children) should remain up-to-date with all required and recommended vaccinations. Programs assisting those who either do not have insurance or are unable to afford vaccinations should be identified and utilized in local jurisdictions.

7. Quarantine/Isolation Plan (Countywide) – If the need for an officially designated quarantine arises, the State is ultimately responsible for the designation and implementation of quarantine procedures.