

## Statewide History of Extreme Temperatures

**Extreme Heat.** A heat wave began on July 30<sup>th</sup> of 2001 and persisted until August 1. Temperatures on July 30<sup>th</sup> 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 31<sup>st</sup>, 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 31<sup>st</sup> 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 31<sup>st</sup> 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, Martin 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 31<sup>st</sup> of 1996, and remained entrenched through February 4<sup>th</sup>. 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 2<sup>nd</sup>. 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 don't 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. Extreme temperatures also elevate wear and tear on roadways due to expansion and contraction of road surfaces. 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. Public Education (Countywide) – County emergency management personnel will work with cities, towns and the regional development commission to develop educational material that can be presented to public via website and brochures. Brochures can be mailed to citizens in coordination with cities via utility billing or other public information mailings. This information will be provided to citizens as a means to prevent damage or impacts of extreme temperatures.
2. 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 ° to 114 °F warrants a heat advisory. This occurs when air temperature reaches 95 °F and the relative humidity is 50 percent. An excessive heat warning is issued when the heat index reaches 115 °F. This occurs with an air temperature of 95 °F and relative humidity of 60 percent. An index of 115 °F or higher creates severe risk for both humans and animals.
3. 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 °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 °F below or lower frequently prompt the closing of schools to protect children, particularly in rural areas.
4. School Closings (Countywide). - Martin 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 tool that may be useful to drought mitigation efforts is the Palmer Index. Wayne Palmer developed the Palmer Index in the 1960's, and it uses temperature and rainfall information entered into a formula to determine dryness. It has become a semi-official drought index in many areas. The Palmer Index is most effective in determining long-term drought (over the span of several months) and is not as valuable for short-term forecasts, namely those over the span of several weeks). In its definitions, it uses 0 as normal, and drought is denoted in terms of negative numbers; for example, -2 is moderate drought, -3 is severe drought, and -4 is extreme drought.

### **Martin County Drought Hazard Risk Assessment**

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

Minimal-None – 4	
Limited – 1 Minor – 2 Substantial – 3 Major – 4	<b><u>Potential Severity</u></b> 2
Minimal – 1 Limited – 2 High – 3 Very High – 4	<b><u>Risk Level</u></b> 1
<b>(Total divided by 4)</b> Very Low – 1 Low – 2 Moderate – 3 High – 4	<b><u>Overall Priority</u></b> 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 a drought has occurred and is ongoing, it is difficult to ascertain whether it is the 6<sup>th</sup> month of an 8-month drought or the 6<sup>th</sup> month of an 8-year drought.

### **History of Drought**

There has been no reporting of drought specific to Martin County over the past 50 years. However, even though there has been no reporting of drought specific to Martin County, this does not mean that the county has not been included in designated drought areas and has not been impacted by drought events in the past. For example, 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. Martin was eligible because the area was contiguous. Another significant drought that impacted the Martin County area occurred between 1987 and 1989. This was a drought event that impacted much of Minnesota, and Martin County was among the affected areas, as can be seen by the rainfall totals for the drought period in the table below. 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 Martin County wells to dry up entirely.

## Drought Gaps and Deficiencies

- Since serious and prolonged 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 Martin 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 Martin County health officials 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.

### ***Smallpox***

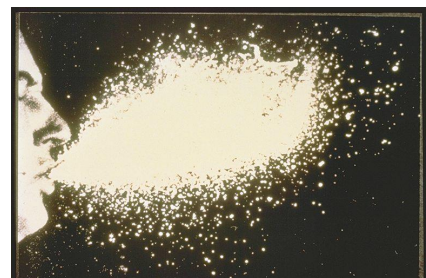
Smallpox has not been an issue in the United States for more than 50 years, but with the threat of terrorism this disease has been thrust to the forefront of public concern and fear. Smallpox is a serious, contagious, and sometimes fatal infectious disease. There is no specific treatment for smallpox, 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.

### ***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.

***Chronic Wasting Disease (CWD)***

CWD naturally occurs in North American deer and Rocky Mountain Elk, however it can have rippling effects on livestock. It belongs to a group of infectious diseases known as "transmissible spongiform encephalopathies" (TSEs). It is caused by an abnormal protein called a prion which affects the animal's brain and is invariably fatal. Usually, months to years pass from the time an animal is infected to when it shows signs of the disease.

**Martin County Infectious Disease Hazard Assessment**

<b>Hazard:</b>	<b>All Infectious Diseases</b>
<b>Location</b>	Countywide
<b>Historic Events</b>	Very limited instances of diseases over the past 50 years, not considered to be of danger to general public
<b>Likely to happen now?</b>	Unlikely
<b>How often?</b>	Infrequently
<b>Where would event occur?</b>	Any area within Martin County, though likely to affect certain demographic groups of people most vulnerable (the very young or the elderly, for example) or in places with high density of persons in a smaller area (such as nursing homes or apartment complexes)
<b>Severity of event?</b>	Could be a major outbreak of life-threatening disease in a worst-case scenario
<b>When would hazard likely occur?</b>	Any time of year
<b>What other hazards could occur at the same time?</b>	Widespread panic, riots, natural hazard events
<b>Economic impacts</b>	Loss or reduction of local business, costs incurred to deal with outbreak (medical personnel, medicine/vaccines, facilities)
<b>Loss of life impacts</b>	Potentially major if a large-scale outbreak occurs
<b>Risk Level</b> VH – Very High H – High L – Limited M – Minimal	Citizens/People: VH Animals/Livestock: VH Housing: M Critical Structures: M Infrastructure: M <b>Total: H</b>
<b>Risk Assessment</b>	
Unlikely – 1	<u>Frequency of Occurrence</u>

Occasional – 2 Likely – 3 Highly Likely – 4	1
More than 12 hours – 1 6-12 hours – 2 3-6 hours – 3 Minimal-None – 4	<b><u>Warning Time</u></b> 1
Limited – 1 Minor – 2 Substantial – 3 Major – 4	<b><u>Potential Severity</u></b> 4
Minimal – 1 Limited – 2 High – 3 Very High – 4	<b><u>Risk Level</u></b> 2
<b>(Total divided by 4)</b> <b>Very Low – 1</b> <b>Low – 2</b> <b>Moderate – 3</b> <b>High – 4</b>	<b><u>Overall Priority</u></b>  2 Low

### **Vulnerability to Infectious Disease**

The risk of infectious diseases is always present in Martin County, just as it is anywhere else, and this must be taken into consideration to assist in keeping the effects of an outbreak to a minimum if and when one should occur. Many infectious diseases are preventable and are controllable, limiting the vulnerability of Martin 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. Martin County may have experienced individual cases of infectious diseases over the last 50 years that have been considered isolated occurrences or minor exposures, and these events are not serious or frequent enough to warrant concern as a hazard event.

### **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 no 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 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 Martin 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) – Martin 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 Martin County agencies to the possibility of an outbreak event.
6. Participation in vaccination programs (Countywide) - All Martin 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.

## **PART FIVE: PRIMARY UNNATURAL HAZARDS**

The next section is concerned with man-made or technological hazards considered to be among the top three in Martin County.