

EXTREME HEAT – Hazard Description

What is extreme heat?

Extreme heat is a combination of high temperatures and high humidity. Conditions of extreme heat are dangerous and can cause injury and death.

The Heat Index is an apparent temperature or a measure of how it feels when temperature and humidity are combined. It is the result of biometeorological studies and takes into account body size, core and body surface temperatures, clothing, the skin's resistance to heat and moisture transfer away from the body. The Heat Index assumes an average-sized adult with clothing in the shade with a 5-mph wind. Being in the full sun, or in an area with little air movement can increase the apparent temperature.

What makes extreme heat dangerous?

(from the Illinois Climatologist Office-Illinois State Water Survey)

The body cools itself by sweating because the evaporation of moisture has a cooling effect. High humidity reduces this evaporation and hinders the body's effort to cool itself. The dew point temperature is a much more useful measure of the moisture content of the atmosphere than the commonly used relative humidity. During summer in Illinois, dew point temperatures in the 50s are generally comfortable. Most people begin to feel the humidity when dew point temperatures are in the 60s. Dew point temperatures in the 70s are rare and cause significant discomfort.

Effects of extreme heat.

Heat cramps: muscular pains and spasms due to heavy exertion. They usually involve the abdominal muscles or legs. It is generally thought that the loss of water from heavy sweating causes the cramps.

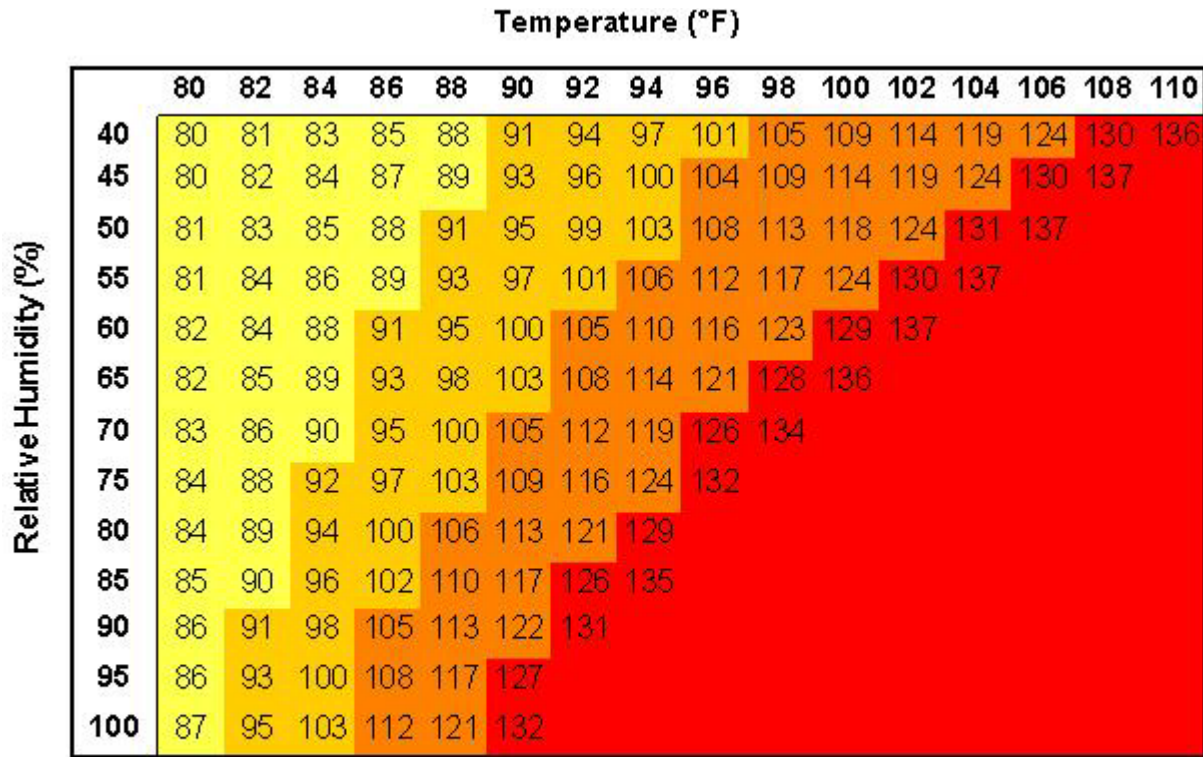
Heat exhaustion: occurs when people exercise heavily or work in a warm, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to vital organs. This results in mild shock.

Heatstroke/Sunstroke: LIFE THREATENING. The victim's temperature control system stops working as the body quits producing sweat. The body temperature can rise so high that brain damage and death may result if the:

Figure 3-1 The relationship of heat disorders to heat index (data from National Weather Service)

Heat Index	Heat Disorder
130° +	heatstroke highly likely with continued exposure
105° - 130°	heat cramps or heat exhaustion likely. heatstroke possible with prolonged exposure or physical activity
90° - 105°	heatstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity
80° - 90°	fatigue possible with prolonged exposure and/or physical activity

Figure 3-2 Heat index derived from humidity and temperature (from the National Weather Service)



Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity
 ■ Caution ■ Extreme Caution ■ Danger ■ Extreme Danger

Extreme heat warnings.

The National Weather Service issues alerts related to extreme heat conditions in the Sangamon County area as shown in Figure 3-3.

Figure 3-3 National Weather Service Alerts (data from Illinois State Climatologist Office)

Type of Alert	Conditions
Heat Warning	when a maximum heat index of 115 or greater and a minimum heat index of 80 or greater is imminent or likely to occur in the next 12 to 24 hours
Heat Advisory	when a heat index of 105 or greater with a minimum heat index of 80 or greater is imminent or likely to occur in the next 12 to 24 hours
Heat Watch	if the heat warning criteria are expected to be reached in 12 to 48 hours
Heat Outlook	when a heat wave is several days away

The extent of previous occurrences of extreme heat in Sangamon County

The data available on extreme heat events in Sangamon County only goes back to 1996. This information is shown in Figure 3-4.

**Figure 3-4 Extreme heat events in Sangamon County from January 1, 1996 - March 31, 2007
(from: National Climatic Data Center)**

Dates	Temperature Ranges	Heat Index Values	Impact Reported
July 26 - July 27, 1997	95° - 100°	105° - 115°	heat related injuries, roads buckling
June 26 - June 28, 1998	middle to upper 90s	105° - 110°	heat related injuries, roads buckling
July 20 - July 26, 1999	lower to middle 90s	105° - 110°	heat related death and injuries
July 28 - July 31, 1999	lower to middle 90s	105° - 110°	heat related injuries
July 22 - July 25, 2005	middle 90s to 100°	105° - 115°	heat related death and injuries
July 30 - August 2, 2006	94° - 100°	105° - 110°	heat related injuries

The locations affected by extreme heat.

Extreme heat conditions generally occur throughout central Illinois during any single event. People in all of our communities are vulnerable to the dangers present during these conditions.

Previous occurrences of extreme heat.

As seen in Figure 3-4, extreme heat conditions in Sangamon County from January 1996 through December 2006 have occurred from late June to early August with July being the prime time. Six out of the seven events started in July. Extreme heat conditions have lasted from 2 days to 7 days. In two cases deaths occurred due to the heat. In July 1999 a 62-year old woman was found in her Springfield home with all the windows closed and no fans or air conditioning. In July 2005 an elderly Springfield woman was found in her mobile home with malfunctioning air conditioning.

Probability of future extreme heat events.

As seen in Figure 3-4 above, in the 11 year period from January 1996 through December 2006, there were 5 years when at least one extreme heat event was recorded in Sangamon County. This indicates a 45% probability that an extreme heat event will occur in Sangamon County in any given year.

EXTREME HEAT –Assessing Vulnerability

Unlike other natural hazard events extreme heat does not leave physical damage. There is little or no damage to buildings. The toll is on people and can lead to extreme medical conditions and death. Heat related injuries are a major concern with heatstroke being a severe medical condition that requires emergency medical treatment. The most vulnerable are the elderly, infants, young children, and people with chronic health problems. In central Illinois most deaths have occurred when people have been in a closed home with no air conditioning. Because the concrete and asphalt in urban areas retains heat and releases it at night offsetting any relief that otherwise would have been felt, there is a greater concern in these areas. The loss of power can also exacerbate a serious situation.