



Section 16. Summer Heat

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Why Summer Heat Is a Threat

Severe, excessive summer heat is characterized by a combination of a very high temperatures and exceptionally humid conditions. When persisting over a period of time, it is called a heat wave. Many areas of the country, including the City of Plano, are susceptible to heat waves.

The major human risks associated with severe summer heat include heatstroke, heat exhaustion, heat syncope, and heat cramps. Most at risk are outdoor laborers, the elderly, children, and people in poor physical health. The effects of severe summer heat are always more pronounced in urbanized areas than in rural areas. Within urbanized such as the City of Plano, the problem is exacerbated by what is known as the heat island effect, in which the concrete and metal infrastructure absorbs radiant heat energy from the sun during the day and radiates that heat energy during the night. This cyclical process essentially “traps” the heat in the urbanized area and makes it as much as 10 degrees warmer than the surrounding hinterland.

During the summer months, the North Central Texas area is frequently affected by severe heat hazards. Persistent domes of high pressure establish themselves, which set up hot and dry conditions. This high pressure prevents other weather features such as cool fronts or rain events from moving into the area and providing necessary relief. Daily high temperatures range into the upper 90’s and low 100’s. When combined with moderate to high relative humidity levels, the heat index moves into dangerous levels, and a heat index of 105 degrees is considered the level where many people begin to experience extreme discomfort or physical distress.

Severe summer heat is an invisible killer. Although a heat wave does not happen with the spectacle of other hazards such as tornadoes and floods, the National Center for Environmental Health reports that, from 1979 to 1999, excessive heat exposure caused 8,015 deaths in the United States. In other words, during this period, more people in the U.S. died from severe summer heat than from hurricanes, lightning, tornadoes, floods and earthquakes combined.



Hazard Profile

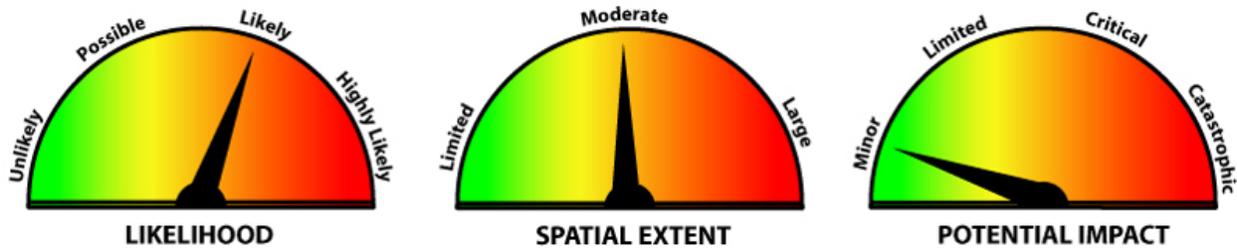


Figure 16-1. Summer Heat Hazard Profile Summary for the City of Plano

The frequency, or likelihood, of excessive summer heat in the City of Plano is “Likely”, with an event probable in the next two to three years.

The spatial extent of excessive summer heat is “Moderate,” expected to affect more than 25% of property in the City of Plano. The potential impact of excessive summer heat is “Minor” resulting in few, if any, injuries. There is only minor property damage and minimal disruption to the quality of life. Any shutdown of facilities is temporary.

Location of Hazardous Areas

There is no distinct geographic boundary to excessive summer heat. Excessive summer heat can occur in every area of the City and of the North Central Texas region equally.

History of Summer Heat

In other parts of the country and other parts of the world, severe summer heat hazards can have devastating consequences. For instance, in 1995, a two-week-long heat wave hit Chicago, and the heat index peaked at 119 degrees Fahrenheit. There were 465 deaths directly attributable to the heat wave, and more than half of the victims were 75 years of age or older.

During the summer of 2003, a heat wave scorched Europe and killed more than 19,000 people, according to official estimates by the Associated Press. Throughout July and August, the heat wave set new records across Europe. France experienced temperatures up to 104 degrees, and southern Germany experienced temperatures of 105 degrees. London, England experienced 96 degrees, the hottest temperature in its history. The heat wave caused billions of dollars in property damage due to crop failures, livestock failures, wildfires and melting Alpine glaciers. But, by far, the greatest



losses were human lives. The European heat wave of 2003 was one of the most deadly natural disasters of the past century.

A heat wave in Texas that broke all previous records occurred in the summer of 1980. There were 69 100-degree days, the most of any year. Additionally, the thermometer exceeded 100 at Dallas-Fort Worth Airport on 42 consecutive days, from June 23rd to August 3rd. The warmest temperatures ever recorded the Dallas-Fort Worth area --- 113 degrees --- occurred June 26th and 27th. July averaged the warmest ever. There were 37 maximum temperatures that tied or set records, the most for a single year. There were 60 deaths statewide, and near 1300 nationwide.

In the summer of 2000, a ridge of high pressure established itself over the north central Texas region. During this time, the region suffered under the longest period of rain-free days in its history (84 consecutive days without rain) and also experienced a severe summer heat event (46 days with temperatures of 100 degrees or higher). This was a severe heat event because the north central Texas region normally only experiences about 15 days of 100 degree temperatures.

The summer of 1998 can also be called a severe heat event. The average high temperature from June through September was 100 degrees, and many of the 1998 statistics rank second only to the summer of 1980.

In the north central Texas region, many people are usually aware of the severe summer heat hazard and are accustomed to the potentially dangerous health effects. However, the region also frequently suffers from property damage due to severe summer heat. For example, during the extreme heat wave of 2000, a 30-inch water main ruptured under a street in downtown Dallas, spilling 20 million gallons of water, flooding many streets and buildings, and causing about \$1.5 million in damage. In the summer of 2003, severe summer heat was blamed for two unrelated train derailments of Union Pacific trains in north Texas. According to Union Pacific officials, the causes of the derailments are "sun kinks," which occur when severe heat expands the rail and moves it out of alignment.

There have been 7 extreme temperature events reported in Collin County, Texas between January 1, 1950 and April 30, 2005. These events resulted in 55 deaths.



Table 16-1. Extreme Summer Heat Events in Collin County, January 1, 1950 – April 30, 2005

Event	Location	Date	Deaths
Collin County			
Extreme Cold	Collin	04/12/1997	0
Excessive Heat	Collin	07/19/1997	2
Excessive Heat	Collin	07/01/1998	32
Excessive Heat	Collin	08/01/1999	3
Excessive Heat	Collin	07/01/2000	8
Excessive Heat	Collin	08/01/2000	5
Excessive Heat	Collin	09/01/2000	5

People and Property at Risk

There is no defined geographic boundary for excessive summer heat events. All population, buildings, critical facilities, infrastructure and lifelines and hazardous materials facilities are considered exposed to the excessive summer heat hazard and could potentially be impacted. As a result, excessive summer heat deserves mitigation consideration by the City of Plano.

It is clear that the City of Plano has been and will continue to be affected by severe summer heat. Based on a qualitative analysis of the impacts that a severe summer heat hazard would have on the social, economic, and environmental components of the region, the risk of a severe summer heat hazard is sufficient enough to merit mitigation consideration. Severe summer heat is also associated with other hazards such as poor air quality, drought, wildfire, expansive soils and water supply interruption.