

Iowa Climate Statement 2019: Dangerous Heat Events Will Be More Frequent and Severe

Our atmosphere and Earth's surface are warming at an unprecedented rate. Globally, the five warmest years on record were each of the last five years, and extreme weather disasters are increasing in frequency and severity (1).

In the Midwest states, we have seen changes in the form of dramatic variability in rainfall, higher humidity, and warmer nights. The excessive moisture and cloud cover have so far thwarted substantial increases in daytime highs and heat waves that other regions have experienced (2). New projections indicate that this will change, with daytime high temperatures rising as moisture patterns adjust over time (3). The current greenhouse gas emissions growth rate is projected to raise the annual number of days above 90°F in Iowa from 23 to 67 by mid-century (3).

A good way to assess heat waves is to look at the average maximum daily temperatures over the hottest five-day period in a year. Over recent decades (1976-2005), that temperature has been about 92°F. By mid-century (2036-2065) the 5-day maximum temperatures are projected to be about 98°F, or 6°F hotter (3). Perhaps even more concerning, one out of every 10 years is projected to have a 5-day period with peak temperatures averaging 105°F (3).

Heat is the leading cause of weather-related deaths in the U.S. (4). People who work outdoors, such as building and road construction workers, military personnel and agricultural workers, are particularly at risk of heat-related illnesses such as heat exhaustion, heat cramps or in severe cases, heat stroke (5-7). Workers with increased risk of heat-related illnesses include those who are overweight, have underlying heart disease or high blood pressure, or those who are over 65 years of age (4).

But it is not just workers who are affected. Many homes, particularly in low-income neighborhoods, are not equipped with air-conditioning and elderly residents may be reluctant to open doors and windows due to fear of intrusion. Thus, these residents are subject to extreme indoor conditions that induce heat stroke and potentially death. Expanding urban heat islands and an increased aging population magnify this problem (4-5, 7).

Animals are also at risk. Iowa's agricultural census includes 23 million hogs, 4 million cattle and 79 million poultry (8). With most of these animals housed in concentrated numbers, there are concerns of animal death, widespread productivity losses and negative economic impacts on animal production. Heat may degrade animal health due to physiological disturbances and a weakened immune system, making them more susceptible to infections and death (9). Further, heat stress slows animal weight gain so more energy and resources are required to offset production efficiency losses (10). Pets kept outdoors or in homes without climate control will be similarly affected, and pets left in vehicles will succumb to the heat more rapidly. Dogs and cats may also be impacted by vector-borne diseases, as the territorial ranges of ticks and mosquitoes expand under conditions associated with climate change (11).

Adaptations to increasing heat waves will require expanded disaster preparedness, increased energy utilization to cool residences and livestock facilities, and curtailment of outdoor work during times of extreme heat. Iowans need to recognize the warning signs for heat-related illnesses and understand who is most vulnerable as we prepare for more frequent and extreme heat events (12).

July 2019 was the hottest month ever in 140 years of record-keeping, according to the World Meteorological Association (13-14). Only by dramatic reductions in greenhouse gas emissions within the next 10 to 15 years will these effects be lessened (15).

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