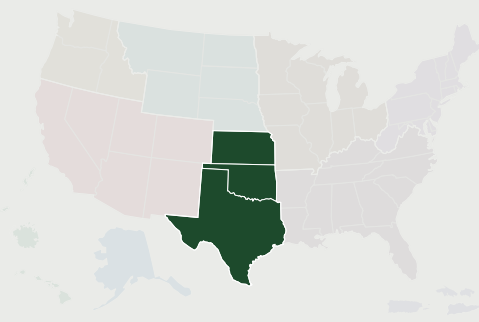


# Preparing for the Health Impacts of Climate Change in **Southern Great Plains**



## **Temperature-Related Death and Illness**

Warmer temperatures will likely lead to an increase in heat stress, especially during the summertime. Heat stress is strongly correlated with complications of lung disease, such as asthma, chronic obstructive pulmonary disease (COPD), and emphysema, as well as dehydration and injurious electrolyte abnormalities. People who are male, Black, 65 years or older, diabetic, unmarried, without air-conditioning, or living below the poverty line have been at higher risk of heat-related death.

Athletes of all ages experience decreased performance, do less outdoor physical activity, and are at higher risk of severe or fatal health issues because of extreme heat, air pollution, and weather hazards.



## **Air Quality Impacts**

Dust is a natural phenomenon in the United States but is worsened in the Great Plains by drought or human activities associated with land use, such as agriculture. Exposure to dust can cause respiratory and cardiovascular health problems. These are also regions where climate change is expected to affect drought patterns, thereby worsening dust problems.

Warmer temperatures will also worsen air pollution by increasing near-surface ozone. In 2023, eighteen Texas counties in the Dallas–Fort Worth and Houston–Galveston metropolitan areas exceeded national ozone standards, affecting more than 12 million people.



## **Extreme Events**

Extreme weather events with resultant physical injury and population displacement are a threat to this region. These threats are likely to increase in frequency and distribution and are likely to create significant economic burdens. Hotter temperatures, heavier precipitation, stronger tropical cyclones, and other climate changes have harmed workers' health and productivity, inflated product or building costs, and disrupted supply chains. Extreme events also pose significant health and healthcare burdens. For example, widespread flooding during Hurricane Harvey affected dozens of communities, including those in the Houston and Beaumont metropolitan areas. Immediate effects included deaths from drowning and trauma that claimed the lives of at least 63

individuals. Additionally, more than 30,000 people were evacuated. Displacement of patients from their communities and healthcare providers led to interruptions in medical treatment.

Climate change-related damages to businesses have threatened the continuity of operations, increased insurance costs, disrupted supply chains, and shifted customer demand. Moreover, small businesses owned by women, non-Whites, and veterans have a higher likelihood of closing after experiencing a natural disaster. These closures have negatively affected the economy and well-being of local communities.



## **Vector-Borne Diseases**

In the Southern Great Plains, hantavirus, Rocky Mountain spotted fever, leptospirosis, and West Nile virus are all endemic and could be impacted by climate change. Tropical diseases, such as dengue virus, chikungunya virus, and Zika virus are transmitted by *Aedes* mosquitoes, which are currently expanding their geographic range in the southern United States. Across western parts of the region, future warmer and drier conditions are projected to support an increased incidence of Valley fever, which is endemic in parts of Texas.



## **Water-Related Illness**

As water evaporates during periods of drought, the remaining water can have higher concentrations of chemicals and solid particles, lower dissolved oxygen levels, and a higher density of pathogens that cause infectious diseases. Drought conditions reduce the number of sources and overall quantity of water available to both humans and animals. Because humans and animals share a reduced supply of water, germ transmission and infectious disease outbreaks become more likely, particularly in unregulated drinking water sources that are not treated. Waterborne diseases linked to drought include amoebiasis, hepatitis A, salmonellosis, schistosomiasis, shigellosis, typhoid, paratyphoid fevers, and infection with *E. coli*, cholera, and leptospirosis.



## **Food Safety, Nutrition and Distribution**

Agriculture is an essential industry in the region. However, increases in carbon dioxide are changing the nutritional composition of food crops. Elevated carbon dioxide levels have been shown to reduce the protein composition of grains, tubers, rice, wheat, and barley. Micronutrient contents are also affected by rising carbon dioxide levels, with atmospheric carbon dioxide concentrations of 550 parts per million being associated with reductions in zinc, iron,



phosphorus, potassium, calcium, sulfur, magnesium, copper, and manganese across a wide range of crops. High temperatures also pose risks to animal health and have been responsible for mass cattle deaths in Kansas. Overall, agricultural producers are experiencing loss of livestock and crops, reduced income, and negative public health outcomes as climate extremes increase in magnitude and frequency.



## Mental Health and Well-Being

A changing environment and subsequent disconnect from the natural region and local customs will likely lead to an increase in negative mental health outcomes for individuals. Children who are BIPOC and from families with lower incomes have less access to high-quality, sizeable urban parks, putting them at higher risk of heat illness, negative physical outcomes, and mental health problems.



## Populations of Concern

Climate change does not affect all people in the same ways. Those most impacted by climate injustices include people with low incomes, rural residents, persons with disabilities, older adults, BIPOC, those who identify as other than cisgender, straight men, immigrants, those living in colonias (Texas-border housing developments lacking basic infrastructure and services), and individuals experiencing homelessness. These communities often lack access to adequate flood infrastructure, sufficient weatherization or air-conditioning, and appropriate shade or green spaces. This increases their risk to heatwaves, flooding, and other extreme weather events. Further, Tribal and Indigenous communities are particularly vulnerable to climate change due to water resource constraints, extreme weather events, higher temperatures, and other public health issues.



## CDC Success Stories

### Kaw Nation

Indigenous communities face health effects from climate change, ranging from limited water resources, extreme weather events, and higher temperatures. The Kaw Nation (located in what is now called Oklahoma) received a one-time mini-grant from CDC and the National Indian Health Board (NIHB) in 2019 for a project focused on local community education and outreach related to climate and health. They created fact sheets and other communications materials to help inform community members of potential climate-related threats and steps to protect health. A major focus was the health impacts of heat.

### Harris County Public Health, Texas

Communities disproportionately impacted by climate change struggle to make their voices heard among policymakers and can receive resources to increase resilience. With support from a 2021 mini-grant from CDC via the National Association of County and City Health Officials (NACCHO), Harris County Public Health (HCPH) began integrating a two-way communication platform into their existing climate program. Here, they can both advise about climate risks and members can share their stories and needs. This plan intends to enhance climate and health knowledge within the county, as well as strengthen the HCPH's outreach to communities most at risk.

This fact sheet was prepared by the CDC Climate and Health Program, which empowers communities to protect public health from a changing climate. Information on the health impacts of climate change is provided by the Fifth National Climate Assessment. For more information on the CDC Climate and Health Program, visit <https://www.cdc.gov/climate-health/index.html>, and the Fifth National Climate Assessment, visit <https://nca2023.globalchange.gov/>.