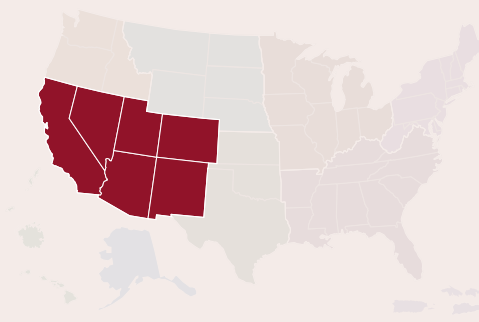


Preparing for the Health Impacts of Climate Change in **Southwest**



Temperature-Related Death and Illness

Under continued climate change, projected increases in hot days and extreme heat events in the Southwest will increase the risk of heat-associated deaths. Under the higher emissions scenario, the Southwest would experience the highest increase in annual premature deaths due to extreme heat in the country, with an estimated 850 additional deaths per year by 2050. By 2090, deaths and economic losses would more than double from 2050 under all emissions scenarios. Heat and other environmental exposures particularly affect outdoor workers.



Air Quality Impacts

Respiratory and cardiovascular disease is associated with exposure to various air pollutants, including ground-level ozone air pollution, dust storms, particulate air pollution (such as from wildfires and dust storms), and aeroallergens (airborne proteins that trigger allergic reactions). These exposures are only expected to worsen with climate change. For instance, intensified aridity from higher temperatures and drought is expected to lead to more dust storms. Consequently, the number of deaths attributed to fine dust is expected to more than double by 2080–2099 under a very high emissions scenario, with increasing exposures for outdoor workers during the warm season. Additionally, drier conditions can also increase the reproduction of a fungus found in soils, potentially leading to the disease coccidioidomycosis or Valley fever. Wildfires are also a growing source of PM2.5, and the costs of adverse respiratory and cardiovascular health outcomes can exceed the billions spent on wildfire suppression.



Extreme Events

Climate change negatively impacts human health and well-being, cultural heritage, property, built infrastructure, economic prosperity, natural capital, and ecosystem services across the Southwest. Impacts include rising air temperatures and sea surface temperatures, both attributable in part to human activities; changes to the timing, form, and amount of precipitation; sea level rise and associated flooding events; increases in extreme heat events; summertime heat stress and heat-related mortality; surface and groundwater reductions; increased wildfire risks; and changes to ocean chemistry. These impacts pose heightened risks to overburdened and frontline communities and to Indigenous peoples.



Vector-Borne Diseases

Infectious diseases like plague and hantavirus pulmonary syndrome disproportionately affect the Southwest region and could be impacted by climate change. Heat extremes and changes in precipitation may influence the distribution and occurrence of vector-borne diseases like West Nile virus and may lead to the emergence of new diseases. The incidence of coccidioidomycosis (Valley fever) in the region has increased and is associated with higher air temperatures and drier soils, with greater risk to those whose job requires dirt disruption.



Water-Related Illness

Climate change has reduced surface water and groundwater availability for people and the natural environment in the Southwest, and there are inequities in how these impacts are experienced. Indigenous communities, in particular, experience a lack of clean water and sanitation services. A major impediment to water access is the cost of water infrastructure, which averages \$600 per acre-foot of water for non-Indigenous families with piped delivery, compared to \$43,000 per acre-foot of water for Navajo families relying on hauled water. Further, greater variability in streamflow threatens the region's ability to consistently produce and use hydropower, impacting a typically reliable and low-carbon source of energy.



Food Safety, Nutrition and Distribution

Food production in the Southwest is vulnerable to water shortages. Increased drought, heat waves, and reduction of winter chill hours can harm crops and livestock; exacerbate competition for water among agriculture, energy generation, and municipal uses; and increase future food insecurity. Droughts and wildfires in the Southwest have contributed to declines in traditional Indigenous staple foods, including fish, wildlife, acorns, corn, and pine nuts. Additionally, ocean warming and acidification, as well as sea level rise, increase risks to shellfish beds (which reduces access for traditional harvesting), pathogens that cause shellfish poisoning, and damage to shellfish populations, which can cause cascading effects in food and ecological systems upon which some Tribes depend.





Mental Health and Well-Being

Climate change may weigh heavily on mental health in the general population and those already struggling with mental health disorders. One impact of rising temperatures, especially in combination with environmental and socioeconomic stresses, is violence towards others and towards self. Slow-moving disasters, such as drought, may affect mental health over many years. Communities that rely especially on well-functioning natural and agricultural systems in specific locations may be especially vulnerable to mental health effects when those systems fail. Indeed, mental health risks are also increasing as farmers and ranchers report moderate to severe levels of anxiety about climate change and the need to adapt. Simultaneously, the loss of stability and certainty in natural systems may affect the physical, mental, and spiritual health of Indigenous peoples with close ties to the land.



Populations of Concern

With 1.5 million Native Americans, 182 federally recognized Tribes, and many state-recognized and non-federally recognized Tribes, the Southwest has the largest population of Indigenous peoples in the country. Yet, Native Americans are among the most at risk from climate change, often experiencing the worst effects because of higher exposure, higher sensitivity, and lower adaptive capacity due to historical, socioeconomic, and ecological reasons. Simultaneously, other frontline communities, such as Hispanic populations, women farmers, and migrant farmworkers, face challenges to water access in their homes as well as food security and health. Specifically, women farmers tend to have fewer resources and are given less compensation than their male counterparts [5]. Additionally, strong evidence indicates that extreme heat disproportionately impacts the health of people experiencing homelessness, outdoor workers, migrant farmworkers, those with low income, and older adults.

CDC Success Stories

Arizona Department of Health Services

Arizonans experience more than 100 days over 100°F per year. Yet, some populations are disproportionately impacted by extreme heat including people experiencing homelessness, older adults, and people without access to air conditioning. Maricopa and Pima counties assessed how to improve the visitor experience for cooling centers, developing best practices, and increasing awareness of locations. As a result of their efforts, new cooling center locations were identified using geospatial analysis; locations are chosen by their ability to best meet demand and support populations at higher risk. Additionally, heat alerts reach nearly 29,000 people on extreme heat days.

San Francisco Department of Health, California

San Francisco is particularly at risk to the health impacts of extreme heat. A study of a 2006 California heat wave found that during extreme heat events, San Francisco's emergency department visits increased more than almost anywhere else in the state. The San Francisco Department of Public Health's Climate and Health Program analyzed surface temperature data alongside 21 social and environmental risks to create the city's first heat vulnerability index. This will help prepare the city for future extreme heat events by informing its extreme heat emergency response plan, developing extreme heat preparedness training specifically for older adults, and engaging local clinicians about how to discuss extreme heat preparedness with their patients.

California Department of Public Health

In the past decade, California experienced more frequent and intense heat events, wildfires and droughts, and reduced air quality that outpaced historic records. Aligned with the Building Resilience Against Climate Effects (BRACE) Framework, the California Building Resilience Against Climate Effects (CalBRACE)

maintains web-based tools and resources for adaptation planning, including consultation and engagement, hazard, vulnerability, disease burden assessments, and strategies for implementation and evaluation. Some online resources include CDPH syndromic surveillance, the Climate Change and Health Vulnerability Indicators (CCHVIz) interactive data platform, and digital stories narrated by community residents about adverse social, economic, and health impacts from extreme heat events.

San Mateo County, California

Worsening air quality from increased pollen, wildfire smoke, and ground-level ozone exacerbate respiratory conditions such as asthma. San Mateo County assessed the magnitude and trends of asthma burden and adapted the Community Health Vulnerability Index for their jurisdiction. This allowed them to address specific local climate and respiratory health issues, especially among populations disproportionately at risk.

Alameda County, California

Often, populations at increased risk to the health impacts of climate change do not receive adequate communications about air quality alerts during wildfire smoke events. In 2020, Alameda County received a mini-grant from CDC via the National Association of County and City Health Officials (NACCHO). With this support, Alameda County engaged community stakeholders through focus groups to develop preferred methods of communication regarding air quality levels and protective action. Using this information, they aim to develop an informed governmental communication protocol to send smoke alerts and information to communities which are disadvantaged and those vulnerable to smoke impacts. Community members at higher risk will receive more prompt and relevant messages to take preventive actions, potentially reducing asthma attacks and other respiratory problems.

Pala Band of Mission Indians

The Southwest has the largest population of Indigenous peoples in the country, and they are often experiencing the worst effects of climate change due to high exposure, sensitivity, and lower adaptive capacity stemming from historical and social factors. The Pala Band of Mission Indians (located in what is now called Southern California) developed climate and health communication and outreach materials tailored to the specific needs of the Pala community, including a plan highlighting the importance of culture-based psychosocial resilience strategies.

By creating culturally competent climate resilience communications, not only will the materials reach more people, but those people are more likely to use the strategies. This work has been supported through several mini-grants from CDC via the National Indian Health Board (NIHB).

Greenville Rancheria

Extreme events like wildfires are causing power outages in rural Indigenous communities. This not only disturbs daily life but can also significantly impact those who need electricity to power

medical equipment. In 2019, Greenville Rancheria (located in what is now called California), received a mini-grant from CDC via the National Indian Health Board (NIHB) to help protect their citizens by enhancing local capacity to respond to wildfires and resulting power outages. They are improving the local health department's ability to anticipate areas that will experience blackouts, as well as developing materials to inform citizens on how to safely operate generators during power outages. Overall, improved communication about wildfires gives rural communities more time to prepare for potential power outages and help mitigate some of the health consequences.

Santa Clara County, California

Existing community-based organizations (CBOs) provide an opportunity to enhance individual and community climate resilience when residents seek services (i.e., food, health, etc.). Santa Clara County is launching a Climate Resilience Leadership Academy for CBOs to increase their knowledge of climate and health, build skills for developing climate action plans, and strengthen self-efficacy through capacity-building projects. These actions will reduce the risks of extreme heat and poor air quality among the community members at risk that the CBOs serve.



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/>.