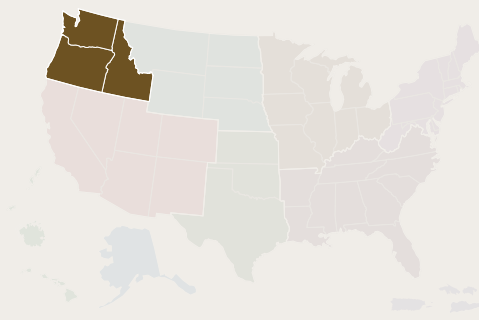


Preparing for the Health Impacts of Climate Change in **Northwest**



Temperature-Related Death and Illness

Heat-related illness and death across the Northwest are expected to increase across all scenarios. Already, heat and wildfire smoke have caused thousands of deaths in the Northwest since 2018. The greatest number of deaths occurred in the summer of 2021, when almost a thousand people perished during an extraordinary heatwave that was partially attributed to climate change.

Extreme heat poses the most consequential health risks for older adults, households with lower incomes, outdoor laborers, people who are unhoused, and others who have limited access to adaptive resources such as affordable cooling options. Further, formerly redlined areas, which are communities with significant Black, Asian, and immigrant populations classified during the New Deal-era as hazardous for financial investment, can be up to 13°F warmer than the city's average surface temperature, disproportionately intensifying some impacts for residents.



Air Quality Impacts

Wildfire smoke can be severe, particularly in communities in the eastern Northwest. During 2004–2009, smoke events were associated with a 7.2% increase in respiratory hospital admissions among adults over 65 in the western United States. In Boise, Idaho, there have been multiple years with smoke levels considered “unhealthy for sensitive groups” (including children) for at least a week during the fire season, causing cancellation of school-related sports activities.

More frequent wildfires and poor air quality are expected to increase excess asthma incidences by the 2050s under a very high emissions scenario. Additionally, projected increases in ground-level ozone (smog), fine particulate matter (PM_{2.5}), and airborne allergens can further complicate respiratory conditions. Young children and older adults are particularly vulnerable, as are those who live in mobile homes, recreational vehicles, or historically disinvested urban areas.

The outdoor tourism and recreation industry in the Northwest supports \$51.9 billion (in 2022 dollars) in annual expenditures and employs more than 588,000 individuals. However, more frequent smoke and extreme heat events will increase risks to outdoor summer recreationists, especially for high exertion activities.



Extreme Events

Warming temperatures and decreased summer precipitation over the past four decades have contributed to increases in the size and maximum elevation of wildfires in Northwest forests, and those trends are expected to continue. Because concurrent heat and drought are becoming more common, the volume of dead vegetation is increasing, which builds the fuel load and wildfire risk. Simultaneously, the length of the wildfire season and the potential for human-caused ignitions in all Northwest ecosystems are expected to increase as drought frequency, duration, and intensity increase.



Vector-Borne Diseases

In the last several years, the region has seen an increase in some infectious diseases. A potential increase in Lyme disease cases in some states is associated with rising temperatures and changing tick habitat. The Washington Department of Health's vector surveillance program has observed an earlier onset of West Nile virus-carrying mosquitoes, likely associated with higher temperatures, and an increasing number of human infections, with some resulting in fatalities. Before 1999, *Cryptococcus gatti* infections were limited to the tropics, but they are now established in Northwest soil, with 76 cases occurring in Oregon in 2015.



Water-Related Illness

Future extreme precipitation events could increase the risk of exposure to water-related illnesses as the runoff introduces contaminants and pathogens (such as *Cryptosporidium*, *Giardia*, and viruses) into drinking water. The Oregon Health Authority recorded spikes in cases of *Salmonella* and *E. coli* during months of extreme heat in 2015. A large outbreak of *Shigellosis* (a bacterial diarrheal disease) occurred in late 2015, affecting a large number of people experiencing homelessness in the Portland Metro region; this outbreak was associated with unusually extreme precipitation. Further, rising temperatures are expected to increase the conditions necessary for harmful algal blooms (HABs), increasing threats to marine mammals, fish, shellfish, and the people who may rely on those food sources. Also of concern, wildfires can damage water infrastructure affecting water availability and quality. This was seen in 2020 and 2021 in the Northwest as wildfires damaged physical elements of the water delivery and treatment systems, disrupted electricity systems, and increased the amount of sediment in waterways and reservoirs.





Food Safety, Nutrition and Distribution

Climate change is projected to impact First Foods, or foods that Tribes have historically cultivated for subsistence, economic, and ceremonial purposes. The loss or decline of First Foods is projected to have cascading physical health impacts for Tribes. Changes in drought conditions and increased water temperatures have increased the potential for freshwater harmful algal blooms (HABs) in recreational waters. Toxins from marine HABs can accumulate in shellfish, leading to illnesses for those who eat them.



Mental Health and Well-Being

Climate-driven hardships can also affect mental health, resulting in outcomes ranging from stress to suicide. Oregon, Washington, and Idaho all rank among the top 10 states in terms of prevalence of mental illness and lowest access to mental health care. Children and youth, in general, will likely experience cumulative mental health effects of climate change over their lifetimes.

The cultural practice of harvesting and consuming First Foods is integral to Tribes and Indigenous health. The loss or decline of First Foods is projected to have cascading physical and mental health impacts for Tribes and Indigenous peoples.



Populations of Concern

Urban communities of color with lower incomes face redlining, restrictive housing covenants, and other historical policies, which have reinforced racial and economic discrimination and exacerbated inequitable exposure to contemporary climate impacts. For instance, formerly redlined areas can be up to 13°F warmer than the city's average surface temperature, thereby disproportionately exposing this community to heat effects.

Rural communities fundamentally rely on natural resources and are therefore particularly vulnerable to climate change. Workers in natural resource and outdoor-based industries will experience heightened exposure to heatwaves and wildfire smoke, and outdoor construction workers face higher rates of traumatic injuries when exposed to extreme heat.

Tribes and Indigenous communities experience both physical and cultural threats in the face of climate change. Extreme weather events can prevent Tribal members, especially elders, from participating in Tribal ceremonies. Further, access to ceremonial sites can also be disrupted or damaged by flooding, landslides, and wildfires, exacerbating degradation associated with other land-use decisions.

CDC Success Stories

Oregon Health Authority

Wildfire smoke and water insecurity disproportionately impact people of color, tribal, and communities of lower income. The Oregon Health Authority's (OHA's) Public Health Division identified the power of community partners and recognized CBOs as part of Oregon's public health system. Oregon provided technical assistance, tools, and evaluation to local public health agencies (LPHAs), community-based organizations (CBOs), and Tribes implementing community-led adaptation actions to improve resilience to wildfire smoke and water insecurity. As a result of their work, 38 CBOs and 36 LPHAs have received assistance in advancing climate equity, building community resilience, and implementing climate adaptation actions.

Washington State Department of Health

More frequent wildfires in Washington have led to increased respiratory illness. Smoke events from 2004-2009 were associated with a 7.2% increase in respiratory hospital admission among adults over 65 in the Western United States. Through mini-grants received from the CDC via the Council of State and Territorial Epidemiologists (CSTE), the National Environmental Health Association (NEHA), and the Association of State and Territorial Health Officials (ASTHO), Washington assessed climate change and respiratory health trends and developed best practices for wildfire communications outreach. They also tested the utility of low-cost air quality sensors during wildfires. Overall, Washingtonians are better informed about wildfires through

improved communication before, during, and after wildfire events, leading to reduced exposure to wildfire smoke.

Lummi Nation

Rising water temperatures increase the potential for toxic harmful algal blooms (HABs), which can be fatal to both humans and wildlife. The Lummi Nation (located in what is now called Washington State) developed plans to protect their community from HABs and toxins in shellfish. This included hazard communication activities and assessment of local community needs. This work has been supported by several mini-grants from CDC via the National Indian Health Board (NIHB).

Swinomish Indian Tribal Community

Tribal populations are experiencing climate impacts first and worst in the Pacific Northwest. Many have experienced an increase in the effects of climate change, including storm surges, flooding, erosion from wind and wave actions, and impacts on Tribal fisheries resources. In 2017, utilizing mini-grants from CDC via the National Indian Health Board (NIHB), the Swinomish Indian Tribal Community (located in what is now called Washington State) created the "Swinomish Climate Change Health Impact Assessment and Action Plan" by tailoring CDC's BRACE framework using Swinomish-specific health values, definitions, and priorities. They documented and shared the process with other Tribes (i.e., through educational materials) so that they may be better informed to move forward with their impact assessment and action plans.

Clackamas County Public Health, Oregon

Clackamas County Public Health partnered with multiple neighboring counties (Multnomah County Health Department and Washington County Public Health) to form a regional collaboration. Together, they developed a comprehensive climate change and health impact assessment report and an accompanying data visualization tool for the Portland metropolitan region. The project involved the engagement of stakeholders to ensure the inclusion of local needs. The assessment data will drive policy efforts related to climate change and highlight how social determinants are the primary driver of climate vulnerability. Clackamas County has been supported with several mini-grants by CDC via the National Environmental Health Association (NEHA), and the National Association of County and City Health Officials (NACCHO).

Seattle-King County, Washington

Wildfire smoke is a routine hazard in the Pacific Northwest that disproportionately affects people with pre-existing health conditions. With support through a 2022 mini-grant from CDC via the National Association of County and City Health Officials (NACCHO), Seattle-King County introduced a pilot program, Clean Air Ambassadors, to educate the community about the importance of indoor air quality. By educating the community, this program reduces health disparities in frontline communities.



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/>.