

Climate and Health Outlook

ISSUED AUGUST 2022

The Climate and Health Outlook is an effort to inform health professionals and the public on how our health may be affected in the coming month(s) by climate events and provide resources to take proactive action. An [associated webpage](#) includes additional resources and information.



Northwest: Counties in Idaho (18), Oregon (13), and Washington (8) are projected to have more than 5 heat exceedance days in August, 2022. Drought is favored to persist in parts of Idaho, Oregon, and Washington. Above normal wildland fire* potential is projected for northern Idaho, southern and central Oregon, and southern and western Washington.



Southwest: Counties in California (23), Utah (13), Nevada (11), Arizona (9), Colorado (6), and New Mexico (6) are projected to have more than 5 heat exceedance days in August, 2022. Drought is favored to persist in most of California and Nevada. Drought is favored to improve in Arizona, Colorado, New Mexico, and Utah. Above normal wildland fire* potential is projected for northern and central California and south-eastern New Mexico.



Southern Great Plains: Counties in Texas (115), Kansas (62), and Oklahoma (57) are projected to have more than 5 heat exceedance days in August, 2022. Drought is favored to persist in most of Texas and southern Oklahoma. Drought removal is favored in parts of Oklahoma and Kansas. Above normal wildland fire* potential is projected for much of Texas and Oklahoma.



Hawai'i and Pacific Islands: The Central Pacific is projected to have a below-average hurricane season. Drought is favored to persist in parts of Hawai'i. Above normal wildland fire* potential is projected for Hawai'i, especially leeward locations.



Northeast: Counties in West Virginia (10) and Pennsylvania (2) are projected to have more than 5 heat exceedance days in August, 2022. Drought is favored to persist or develop in parts of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.



Southeast: The Atlantic basin is forecasted to have an above-average hurricane season. Counties in Arkansas (42), Mississippi (24), Alabama (18), Tennessee (17), Louisiana (15), Kentucky (10), Georgia (6), South Carolina (4), North Carolina (3), and Virginia (3) are projected to have more than 5 heat exceedance days in August, 2022. Drought is favored to persist in northern Louisiana and southern Arkansas. However, drought removal is favored in parts of Arkansas, Kentucky, Louisiana, Mississippi, North Carolina, Tennessee, and Virginia. Above normal wildland fire* potential is projected western Arkansas.



*Smoke from wildfires can impact health hundreds of miles from site of the fire.
A "heat exceedance day" is when the daily maximum temperature is above the 95th percentile value of the historical temperature distribution in that county. Developed with data from the Centers for Disease Control and Prevention, National Oceanic and Atmospheric Administration, and National Interagency Fire Center.

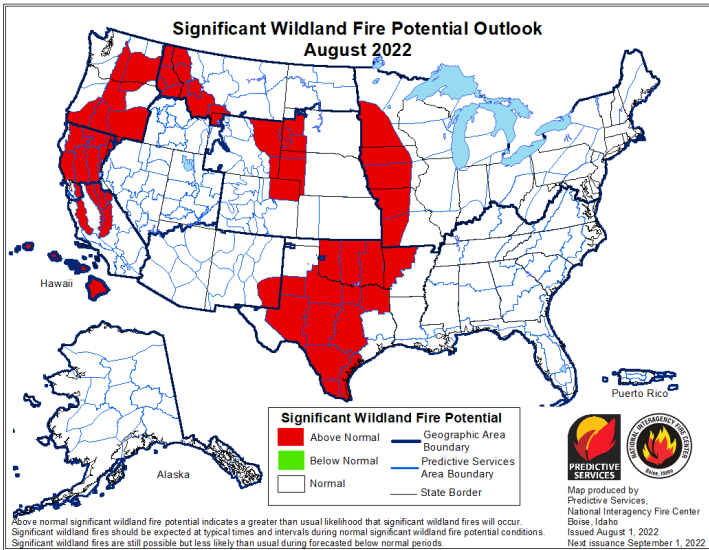


Figure. The [National Significant Wildland Fire Potential Outlook](#) identifies areas with above, below, and near normal significant fire potential using the most recent weather, climate, and fuels data available. These outlooks are designed to inform decision makers for proactive wildland fire management.

Year-to-date acres burned for the US is approximately 160% above the 10-year average, with over 90% of the total acres burned in the Alaska, Southwest, and Southern Areas. In August, above normal significant fire potential is forecast for much of Oklahoma and Texas into western Arkansas. Above normal potential is also likely in portions of the Missouri Valley and western Mississippi Valley and in eastern Wyoming, western South Dakota, and western Nebraska. Northern California, the Inland Northwest, and northern Rockies, along and west of the Divide, are expected to have above normal significant fire potential, with above normal potential also forecast in portions of the central and southern Sierra and just inland on the central California coast. Hawai’ian Islands, especially leeward sides, will have above normal potential as well.

Who is at high risk in the counties with above-normal wildland fire potential in August?

Wildland fires are occurring more frequently in the United States and present a health hazard for populations living close to a fire. As indicated in the map to the left, **684** counties across **19** states are projected to have above-normal wildfire potential in August. In these counties, the total population at risk is **58,588,799** people. Of these counties:

- 194 (28%)** have a high number of people aged 65 or over, living alone.
- 300 (44%)** have a high number of people without health insurance
- 317 (47%)** have a high number of uninsured children.
- 133 (20%)** have a high number of people with frequent mental distress.
- 85 (12%)** have a high number of adults with asthma.
- 144 (21%)** have a high number of adults with coronary heart disease.
- 140 (21%)** have a high number of people living in poverty.
- 129 (19%)** have a high number of people with electricity-dependent medical equipment and enrolled in the HHS emPOWER program.
- 122 (18%)** have a high number of people in mobile homes.
- 163 (24%)** have a high number of people with one or more disabilities.
- 170 (25%)** are identified as highly vulnerable by CDC’s Social Vulnerability Index.

**“A high number” indicates that these counties are in the top quartile for this indicator compared to other counties

Wildfires Affect Health in Many Ways

Wildland fire increases the risk for a diverse range of health outcomes. For example:



Due to the nature of their work, firefighters are at risk of developing severe heat-related illness (such as **heat stroke**) and rhabdomyolysis (**muscle breakdown**).



Wildfire can cause **burns** through contact with flames and hot surfaces as well as chemical and electrical burns.



Wildfire smoke can irritate the respiratory tract and lead to **reduced lung function, bronchitis, exacerbation of asthma, and heart failure.**



For pregnant people, smoke exposure can result in problems with a **baby’s nervous system**, or can lead to **miscarriage** or **birth defects**.

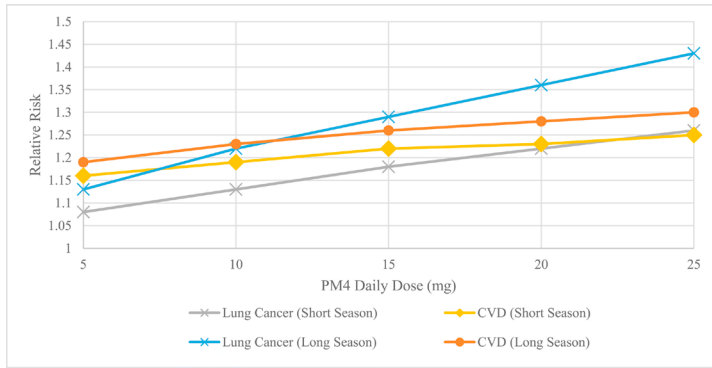


Wildfire smoke can affect the immune system, leading to increased vulnerability to **lung infections** like COVID-19.



Smoke and ash from wildfires can travel downwind and affect air quality hundreds of miles away from the fire.

How Does Smoke Impact Firefighter Health?



Source: Kathleen M. Navarro, Michael T. Kleinman, Chris E. Mackay, Timothy E. Reinhardt, John R. Balmes, George A. Broyles, Roger D. Ottmar, Luke P. Naher, Joseph W. Domitrovich, Wildland firefighter smoke exposure and risk of lung cancer and cardiovascular disease mortality, Environmental Research, Volume 173, 2019, Pages 462-468, ISSN 0013-9351, <https://doi.org/10.1016/j.envres.2019.03.060>.

One study funded by the [Joint Fire Science Program](#) found that wildland firefighters are at an increased risk for the development of lung cancer (8 percent to 43 percent above the general population) and cardiovascular disease (16 percent to 30 percent above the general population). This risk increases with an increase in career duration and days spent on wildfire incidents (short and long season) each year. The risk of lung cancer steadily rose as career length, while the risk of cardiovascular disease increased sharply for firefighters with 5- to 15-year careers and increased slightly over 20- and 25-year careers. As fire seasons continue to increase in severity and duration, firefighters should reduce exposure to smoke in any way possible.

Wildfire Smoke Can Travel Far Distances

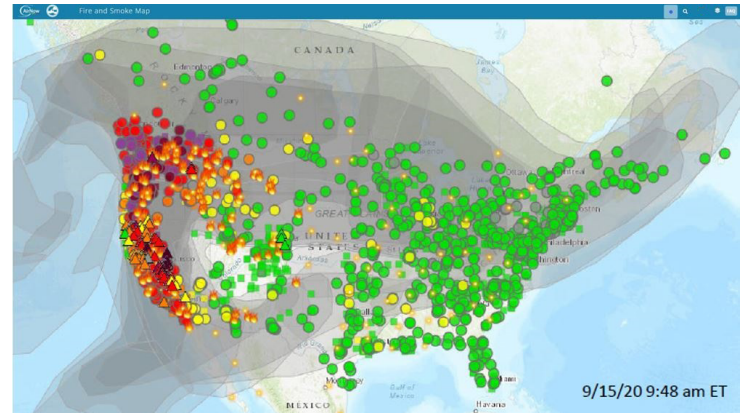


Figure: Example of the [AirNow](#) Fire and Smoke Map run by U.S. EPA and the U.S. Forest Service. This screenshot, from September 15, 2020, shows the far distances smoke can travel from the location of wildfires. The map also shows the U.S. Air Quality Index (AQI) from hundreds of air quality monitors and more than 10,000 privately owned air sensors. Green symbols indicate a good AQI; yellow indicates moderate; orange indicates unhealthy for sensitive groups; red indicates unhealthy for everyone; and purple indicates very unhealthy. The flame symbols indicate a large fire incident, and the small yellow spark symbols indicate unverified satellite fire detections.

Wildfire smoke can impact the health of people close to the fire and at distances far from fire impacted areas, depending on meteorological conditions, such as wind speed and direction. As wildfires burn, they generate smoke that is comprised of a mixture of particulate matter (PM) (also referred to as particle pollution) and gaseous pollutants (e.g., carbon monoxide). The pollutant of most concern to public health during a smoke event is fine particulate matter, or PM2.5, because these particles can penetrate deep into your lungs and cause adverse health effects.

Resources to Reduce Health Risks Associated with Wildfire and Smoke

Wildfire Smoke's Biggest Health Concern

PM10
● ≤ 10 μm

HUMAN HAIR
50-70 μm

PM2.5
● ≤ 2.5 μm

Particulate Matter (PM)

PM is the most concerning pollutant from short-term exposure to wildfire smoke. Particles can be <2.5 microns (μm) in diameter and can be inhaled into the deepest parts of the lungs causing heart and lung effects.

Source: <https://ww2.arb.ca.gov/protecting-yourself-wildfire-smoke>

The [Ready.gov Wildfires](#) site, [Centers for Disease Control and Prevention \(CDC\) Wildfires](#) site, and Environmental Protection Agency (EPA) [Smoke-Ready Toolbox for Wildfires](#)

include information about how to prepare for wildfires, stay safe during a fire, and return home after a fire.

[Pregnant people](#) should take actions to reduce their exposure to wildfire smoke, which could affect the developing fetus. Other groups like young children, the elderly, those with pre-existing heart and lung disease, and outdoor workers also should take extra care to reduce their exposures to wildfire smoke. Monitor fires and air quality in your area through [AirNow](#) and follow instructions about exercise and going outside for “sensitive individuals.”

The California [Air Resources Board Air Cleaner Information for Consumers](#) has information about how to select a safe and effective air cleaner. Exercise caution in using air-cleaning devices in the home; some can produce ozone levels that are higher than health-based standards.

U.S. Monthly Drought Outlook Drought Tendency During the Valid Period

Valid for August 2022
Released July 31, 2022

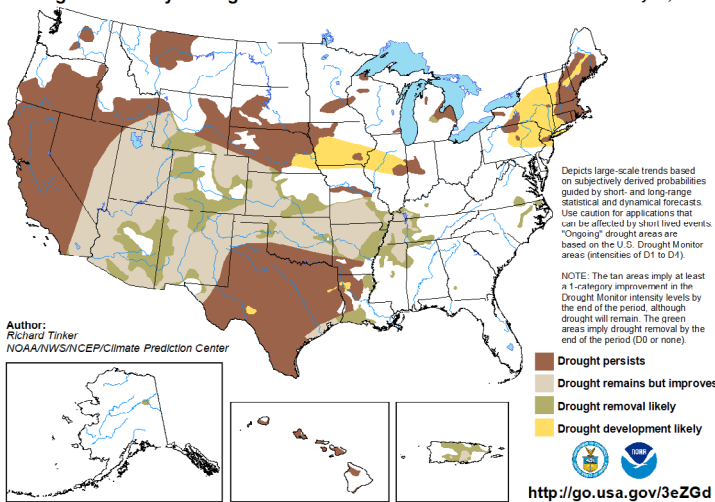


Figure: The National Weather Service Climate Prediction Center's Monthly Drought Outlook is issued at the end of each calendar month and is valid for the upcoming month. The outlook predicts whether drought will persist, develop, improve, or be removed over the next 30 days or so. For more information, please refer to drought.gov.

For August, the National Weather Service Climate Prediction Center found drought is favored to persist in much of California, Hawai'i, Nevada, Oregon, and Texas as well as parts of Idaho, the Northern Great Plains, and New England. Drought development is favored in parts of Connecticut, Illinois, Iowa, New Jersey, New York, and Pennsylvania. Drought removal is favored in the central U.S., Puerto Rico, and much of the eastern South West.

Drought can lead to decreased water quantity and quality that have direct and indirect impacts on health – increasing incidence of illness among those living in the affected area and worsening mental health outcomes as livelihoods are challenged

Who is at high risk in the counties projected to have 'persistent drought' in August?

As indicated in the map to the left, **618** counties across **30** states are projected to have persistent drought in August. In these counties, the total population at risk is **88,894,450** people and, of those, **1,019,195** people work in agriculture. Of these counties:

- 147 (24%)** have a high number of people aged 65 or over, living alone.
- 139 (26%)** have a high number of people living in rural areas.
- 132 (21%)** have a high number of people living in poverty.
- 83 (14%)** have a high number of people with frequent mental distress.
- 83 (14%)** have a high number of adults with asthma.
- 268 (43%)** have a high number of people without health insurance.
- 317 (51%)** have a high number of uninsured children.
- 92 (15%)** have a high number of Black or African American persons.
- 157 (26%)** have a high number of people with severe housing cost burden.
- 132 (21%)** have a high number of people in mobile homes.
- 131 (21%)** have a high number of people with one or more disabilities.
- 184 (30%)** are identified as highly vulnerable by CDC's Social Vulnerability Index.

**"A high number" indicates that these counties are in the top quartile for this indicator compared to other counties

Drought Affects Health in Many Ways

Drought increases the risk for a diverse range of health outcomes. For example:



Low crop yields can result in rising food prices and shortages, potentially leading to **malnutrition**.



Dry soil can increase the number of particulates like **dust and pollen** that are suspended in the air, which can irritate the bronchial passages and lungs.



Dust storms can spread the fungus that causes coccidioidomycosis (**Valley Fever**).



If there isn't enough water to flow, waterways may become stagnant breeding grounds for **disease vectors** like mosquitos as well as viruses and bacteria.

- Drought's complex economic consequences can increase **mood disorders, domestic violence, and suicide**.



Long-term droughts can cause **poor-quality drinking water** and leave inadequate water for hygiene and sanitation.

Drought and Arsenic in Domestic Wells

Population Likely With Arsenic Concentration > 10ug/L in Domestic Well Water

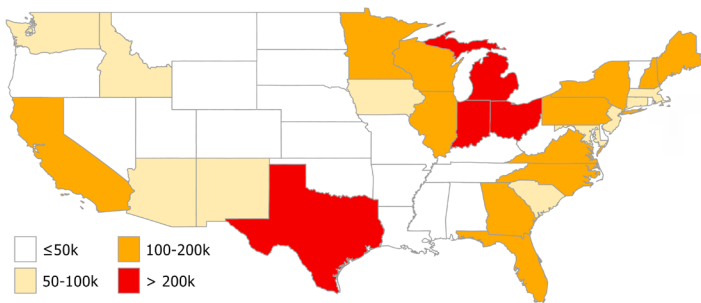


Figure: Map showing the probability of having arsenic >10 µg/L (“high arsenic”) in domestic wells during drought. Hotspots generally reflect areas in the U.S. with high observed concentrations including New England (predominantly Maine and New Hampshire), a band in the upper Midwest, the southwest (most notably Nevada, southern Arizona, southern and central California, and isolated regions in all western states), and southern Texas.

Drought conditions can lead to elevated levels of naturally occurring arsenic in the water we drink. The risk of contamination increases the longer that a drought persists. In a [study](#) done by U.S. Geological Survey and Centers for Disease Control and Prevention in 2021, researchers estimated that over 9% (4.1 million) of the 44.1 million people in the lower 48 states who use private domestic wells were potentially exposed to unsafe levels of arsenic during drought conditions compared to about 6% (2.7 million people) during non-drought conditions.

Chronic exposure to arsenic from drinking water is associated with an increased risk of several types of cancers, developmental issues, cardiovascular disease, adverse birth outcomes and impacts on the immune and endocrine systems. Arsenic occurs in groundwater due to chemical reactions between the rocks and water, lowering of water levels due to drought may cause chemical changes that release more arsenic from the rocks. Less water could also concentrate existing arsenic in the water.

Resources to Reduce Health Risks Associated with Drought



Source: https://www.cdc.gov/nceh/ehs/docs/When_Every_Drop_Counts.pdf

The [Centers for Disease Control and Prevention \(CDC\) Drought and Health site](#) and [Ready.gov Drought site](#) have information on the health implications of drought and how to prepare. The CDC’s [When Every Drop Counts](#) can assist public health officials, practitioners, and other stakeholders in their efforts to understand and prepare for

drought in their communities. [The U.S. Drought Portal](#) also provides data, decision-support products, resources, and information on drought.

Drought is a slow-moving hazardous event, so the psychological effects of living through this type of disaster are more subtle and last longer than with other natural disasters. The Substance Abuse and Mental Health Services Administration (SAMHSA) [Helpline and Text Service](#) is available 24/7, free, and staffed by trained crisis counselors. Call or text **1-800-985-5990** to get help and support for any distress that you or someone you care about may be feeling related to any disaster.

The Department of Agriculture offers [programs](#) that can help with drought recovery as well as those that can help farmers manage risk and build resilience.

The U.S. [Drought Monitor](#) is an online, weekly map showing the location, extent, and severity of drought across the United States. The Department of Agriculture uses the Drought Monitor to determine a producer’s eligibility for certain drought assistance programs. You can [report drought-related conditions and impacts](#) within the U.S. and associated territories to the Drought Monitor.