Another Dangerous Fire Season is Looming in the Western U.S., and the Drought-Stricken Region is Headed for a Water Crisis

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Just about every indicator of drought is flashing red across the western U.S. after a dry winter and warm early spring. The snowpack is at less than half of normal in much of the region. Reservoirs are being drawn down, river levels are dropping and soils are drying out.

It’s only May, and states are already considering water use restrictions to make the supply last longer. California’s governor declared a drought emergency in 41 of 58 counties. In Utah, irrigation water providers are increasing fines for overuse. Some Idaho ranchers are talking about selling off livestock because rivers and reservoirs they rely on are dangerously low and irrigation demand for farms is only just beginning.

Scientists are also closely watching the impact that the rapid warming and drying is having on trees, worried that water stress could lead to widespread tree deaths. Dead and drying vegetation means more fuel for what is already expected to be another dangerous fire season.
U.S. Interior Secretary Deb Haaland and Agriculture Secretary Tom Vilsack told reporters on May 13, 2021, that federal fire officials had warned them to prepare for an extremely active fire year. “We used to call it fire season, but wildland fires now extend throughout the entire year, burning hotter and growing more catastrophic in drier conditions due to climate change,” Vilsack said.

As climate scientists, we track these changes. Right now, about 84% of the western U.S. is under some level of drought, and there is no sign of relief.

The U.S. Drought Monitor for mid-May shows nearly half of the West in severe or extreme drought. National Drought Mitigation Center/USDA/NOAA

The many faces of drought

Several types of drought are converging in the West this year, and all are at or near record levels.

When too little rain and snow falls, it’s known as meteorological drought. In April, precipitation across large parts of the West was less than 10% of normal, and the lack of rain continued into May.

Rivers, lakes, streams and groundwater can get into what’s known as hydrological drought when their water levels fall. Many states are now warning about low streamflow after a winter with less-than-normal snowfall and warm spring temperatures speeding up melting. The U.S. Bureau of Reclamation announced it would cut off water to a canal serving farms in the Klamath Project on the Oregon-California border because of low water supplies. It also warned that Lake Mead, a giant Colorado
River reservoir that provides water for millions of people, is on pace to fall to levels in June that could trigger the first federal water shortage declaration, with water use restrictions across the region.

Dwindling soil moisture leads to another problem, known as agricultural drought. The average soil moisture levels in the western U.S. in April were at or near their lowest levels in over 120 years of observations.

These factors can all drive ecosystems beyond their thresholds – into a condition called ecological drought – and the results can be dangerous and costly. Fish hatcheries in Northern California have started trucking their salmon to the Pacific Ocean, rather than releasing them into rivers, because the river water is expected to be at historic low levels and too warm for young salmon to tolerate.

**Snow drought**

One of the West’s biggest water problems this year is the low snowpack.

The western U.S. is critically dependent on winter snow slowly melting in the mountains and providing a steady supply of water during the dry summer months. But the amount of water in snowpack is on the decline here and across much of the world as global temperatures rise.

Several states are already seeing how that can play out. Federal scientists in Utah warned in early May that more water from the snowpack is sinking into the dry ground where it fell this year, rather than...
running off to supply streams and rivers. With the state’s snowpack at 52% of normal, streamflows are expected to be well below normal through the summer, with some places at less than 20%.

**Anthropogenic drought**

It’s important to understand that drought today isn’t only about nature.

More people are moving into the U.S. West, increasing demand for water and irrigated farmland. And global warming – driven by human activities like the burning of fossil fuels – is now fueling more...
widespread and intense droughts in the region. These two factors act as additional straws pulling water from an already scarce resource.

As demand for water has increased, the West is pumping out more groundwater for irrigation and other needs. Centuries-old groundwater reserves in aquifers can provide resilience against droughts if they are used sustainably. But groundwater reserves recharge slowly, and the West is seeing a decline in those resources, mostly because water use for agriculture outpaces their recharge. Water levels in some wells have dropped at a rate of 6.5 feet (2 meters) per year.

The result is that these regions are less able to manage droughts when nature does bring hot, dry conditions.

Rising global temperatures also play several roles in drought. They influence whether precipitation falls as snow or rain, how quickly snow melts and, importantly, how quickly the land, trees and vegetation dry out.

Extreme heat and droughts can intensify one another. Solar radiation causes water to evaporate, drying the soil and air. With less moisture, the soil and air then heat up, which dries the soil even more. The result is extremely dry trees and grasses that can quickly burn when fires break out, and also thirstier soils that demand more irrigation.

Alarmingly, the trigger for the drying and warming cycle has been changing. In the 1930s, lack of precipitation used to trigger this cycle, but excess heat has initiated the process in recent decades. As global warming increases temperatures, soil moisture evaporates earlier and at larger rates, drying out soils and triggering the warming and drying cycle.
Fire warnings ahead

Hot, dry conditions in the West last year fueled a record-breaking wildfire season that included the largest fires on record in Colorado and California.

As drought persists, the chance of large, disastrous fires increases. The seasonal outlook of warmer and drier-than-normal conditions for summer and fire season outlooks by federal agencies suggest another tough, long fire year is ahead.

This article was updated with a statement from Secretaries Deb Haaland and Tom Vilsack.