Why 2021’s heat waves are so brutal

The US is only a few days into summer and another heat wave is already coming for the West. “Record shattering” would be an understatement to describe the last heat wave, which lingered over the Southwest last week and has since shifted eastward. Roughly 4,000 new temperature records have already been set this year. More are going to make the books over the next week.

A heat dome is a trap
Both heat waves are caused by atmospheric conditions called heat domes. In short, a heat dome is a trap. It forms when high pressure in the upper atmosphere creates a sort of lid or cap that stops hot air from escaping, according to NOAA. As the air sinks back down to Earth, it compresses and heats up even more. The heat dome also blocks out clouds and storms, which might otherwise provide some relief from the sun’s hot rays. A heat dome also leads to longer and more intense heat waves because it creates a feedback cycle, according to Texas Tech University climate scientist Katharine Hayhoe. The hotter temperatures become, the stronger the heat dome gets, and vice versa.

The heat dome that’s forecast to settle over the Pacific Northwest in the next three to seven days can also be called a “warm-core high,” according to National Weather Service forecaster David Roth. That’s a high pressure system that strengthens with height. The June record high for the state of Washington is 113 degrees Fahrenheit, which Roth says will probably be “threatened.” It’s unusual that this heat dome is forming so far north, where temperatures don’t normally get

nearly as high as they are forecast to reach in the coming days. The average high temperature in Seattle around this time of year is 74 degrees.

That makes this heat dome particularly dangerous for communities that aren't built for the heat. "You get acclimated to warm in the summer, but that's only if you're used to experiencing those conditions. This could be very unlike any other heatwave they've experienced," Roth says. "So yeah, you would worry more about heat exhaustion, heat stroke, that sort of thing. Everyone's going to need to stay in air-conditioned places and keep hydrated." Unfortunately, only a third of homes in the Seattle area have air conditioning, according to a 2018 study.

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The conditions driving this heat wave could persist until the end of next week, Roth says. It's also expected to expand eastward toward Idaho and Montana, and southward into California next week. Lewiston, Idaho is forecast to reach 112 degrees Fahrenheit on Tuesday, four degrees above its daily record set in 1881.

Heat domes are also bad news when it comes to drought and wildfires. They're often related to drought because they direct storm systems away from the region, according Hayhoe. The West is already in an epically bad drought that is drying up reservoirs and forcing farmers to abandon crops. Hot, dry conditions across the Western US are already turning forests and other ecosystems into tinder boxes early in the fire season.

While the fever the US is running might feel unusual now, it could be part of a new normal driven by climate change. Higher global average temperatures are making heat waves and droughts more frequent and intense, while the fire season is growing longer.

“It’s as if we always have a chance of rolling a double six — so that’s an exceptional heatwave. But as climate changes, it’s sneaking more sixes onto our dice,” Hayhoe tells *The Verge*. “Climate change is also sneaking some sevens onto our dice. So not only are we getting more of these, but we’re also seeing that they’re getting stronger.”

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