

Before the floods, Asheville was called a 'climate haven.' Is anywhere safe?

As climate change leads to more severe hurricanes, mountain communities like Asheville, N.C., face growing flood danger.

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Asheville, N.C., seemed like an ideal place to escape the worst effects of global warming. In recent years, media outlets and real estate agents named the city a “climate haven” because of its cooler-than-normal temperatures in the South and a location far inland from the flooding-pummeled coasts. Last year, the Asheville Citizen Times reported on worries that the city would become overcrowded from climate-change migration.

Then, the flooding came. In some areas of western North Carolina, four to five months of rain fell in less than three days. More than 40 people have died in Buncombe County, where Asheville is the county seat, as homes, businesses, roads and livelihoods were swept away in the rising waters of Hurricane Helene.

The floods illuminate two truths about a world transformed by global warming, experts say. It is unlikely that any places will be truly safe from climate change — and even high-elevation, inland areas are vulnerable to drowning in a world where planetary warming is fueling heavier rains.

It is a law of physics that, for every degree Celsius increase in temperature, air is able to hold 7 percent more water vapor. This phenomenon increases the moisture available for storms, making individual events wetter than they otherwise would be and increasing the risk of unprecedented rain.

The United States and countries around the globe are already experiencing what could lie in store. Last year, areas of Vermont were deluged by devastating rains that would have been exceedingly rare in an unchanged climate. This summer, a town in southern New Mexico was struck by eight floods in four weeks, after wildfires destroyed vegetation and subsequent rain funneled directly into neighborhoods. And just a few weeks ago, floods and heavy rain surged over Central Europe.

Although some have called this age the “Pyrocene,” because of growing wildfires, scientists also emphasize the world is heading toward a watery future of surging oceans and worsening floods.

“What happened in western North Carolina really speaks to the challenge of atmospheric warming generating heavier rainfall,” said Nicolas Zegre, director of the Mountain Hydrology Lab at West Virginia University. “That is a tremendous amount of water that has nowhere to go.”

Two preliminary analyses released Monday suggested that climate change contributed to Helene's catastrophic rains. One [study](#), led by Michael Wehner, a climate scientist at Lawrence Berkeley National Laboratory in California, found the precipitation in Georgia and the Carolinas — which in some places exceeded 30 inches in three days — was made up to 20 times more likely because of human-caused warming. A second [study](#), from European researchers, found that tropical cyclones like Helene are 20 percent wetter than they would have been in a world without climate change.

Although neither analysis has been formally published in a journal, both utilized well-established, peer-reviewed techniques to detect warming's influence on the storm.

Climate change is also [shifting the behavior of hurricanes](#), research suggests, by heating up the oceans where they form. Elevated water temperatures provide more fuel for tropical cyclones, helping them to become [more intense](#). This, in turn, allows the storms to linger longer over land, where they can cause more damage.

Hurricanes used to lose 75 percent of their intensity in the first day after making landfall, but a [2020 study in the journal Nature](#) found they now decay by about 50 percent. "As the world continues to warm," wrote the Japan-based researchers, "the destructive power of hurricanes will extend progressively farther inland."

While scientists say that changes in flooding are more difficult to link to climate change than changes in precipitation — partly because it also depends on the moisture of the soil before an extreme rain event, and the local infrastructure's ability to funnel away water — intense rainfall is likely to spur changes in flooding across the country.

According to a [study](#) by Stanford University researchers, around one-third of flood damages in the United States between 1988 and 2017 were spurred by changes in extreme precipitation — which in turn, were made more likely by climate change.

The danger is especially acute in mountainous areas like Appalachia, where steep topography and shallow soils inhibit the absorption of rainfall. "There's really nowhere for water to go except down slope," said West Virginia University's Zegre.

Unfortunately, he added, that means water runs off into narrow valleys and secluded hollers where many homes and businesses lie.

That reality became evident this past weekend, as Helene turned roads into rivers and inundated downtowns throughout western North Carolina. In Asheville's River Arts District, brown floodwaters reached the roofs of eclectic galleries and trendy craft breweries. The central streets of Boone were transfigured by water and mud. In the small, [working-class enclave of Swannanoa](#), entire homes had been washed away in the storm.

Yet experts said that federal flood maps often underestimate the risks faced by inland communities. According to a [2020 report](#) by the First Street Foundation, areas of Appalachia rank near the top of zones with "hidden flood risks" — that is, areas where the Federal Emergency Management Agency underestimates the risks of a severe flood. The foundation calculated that [18 percent](#) of the county's properties were at risk of flooding, compared with 2 percent calculated by federal officials.

“People associate hurricane risks with coastal areas,” said Frances Davenport, a professor of civil and environmental engineering at Colorado State University. “But they represent a really large amount of inland coastal flooding in the United States.”

According to the National Hurricane Center, more than half of the hurricane deaths that occurred between 2013 and 2022 could be attributed to freshwater flooding from rainfall, rather than storm surges by the coast.

Other areas at high risk of inland flooding include the Pacific Northwest, areas of Pennsylvania and Upstate New York, and some Midwestern states like Iowa and Wisconsin, according to the First Street Foundation report.

Mohammed Ombadi, a hydroclimatologist at the University of Michigan, noted that mountainous areas are at particularly high risk for flash floods — sudden surges of water that often catch people off-guard. When water is accelerated downhill, it can turn gentle creeks into deadly torrents within hours.

These events can be difficult to forecast, Ombadi said, but his research suggests that mountain communities become more flood-prone if they experienced rainfall in the days and weeks before an extreme precipitation event.

“If it’s just enough to make soil moisture conditions a little bit higher, that would increase the risk of flooding significantly,” he said.

In the days before Helene made landfall, its moisture was sucked into a front that ran ahead of the hurricane, swamping the U.S. Southeast before the main storm arrived. This kind of “predecessor rain event” is associated with high-intensity hurricanes, studies suggest — meaning that it could become more common as warming oceans give rise to more and more severe storms.

Yet even as flood dangers grow, many Americans are moving into risky areas like Buncombe County. An analysis by Redfin showed that flood- and fire-prone counties gained thousands of residents last year, even as safer counties lost residents. While more Americans are becoming aware that climate change is affecting their homes, the push to find affordable housing and amenities is still stronger than any concerns about natural disasters.

Sometimes, that development puts even more people in harm’s way.

Jesse Keenan, a professor of sustainable real estate and urban planning at Tulane University in New Orleans, says that Asheville has seen people moving in from more coastal areas of North Carolina.

“There’s no such thing as a climate haven,” Keenan said. “There are ‘sending zones’ and there are ‘receiving zones.’ And Asheville is no doubt becoming — and has already been — a receiving zone.”

Even with the catastrophic floods, Keenan predicted, the region could attract more people. As the area begins to rebuild, he expects wealthy developers and families to move in, seizing an opportunity to buy up cheap land.

“Wealthy people come in and buy up land after disasters,” he said. “This disaster will actually fuel development.”

