

# We Mapped Heat in 3 U.S. Cities. Some Sidewalks Were Over 130 Degrees.

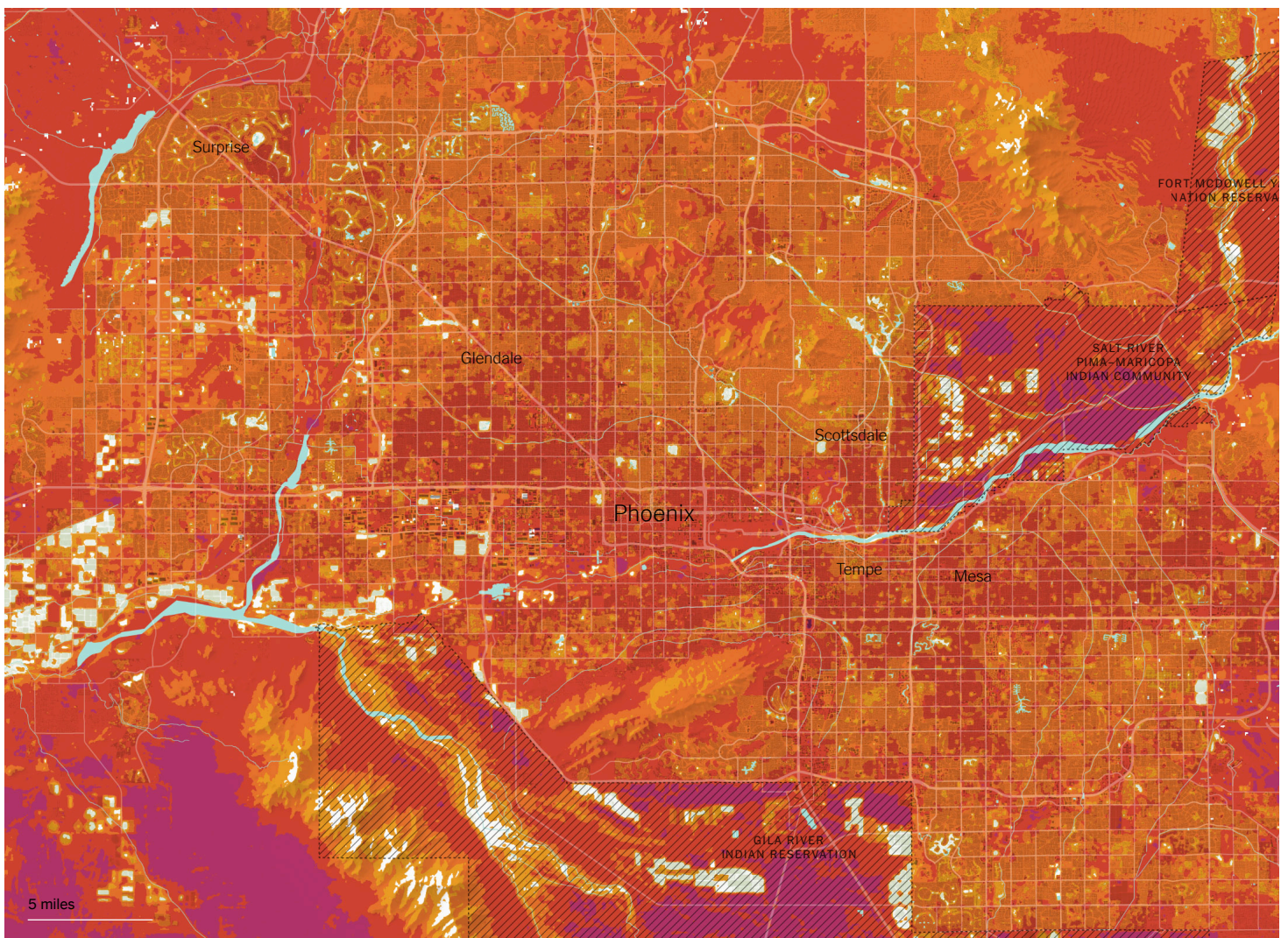
By Raymond Zhong and Mira Rojanasakul July 17, 2024

We usually talk about summertime heat in terms of how hot the air is, but there’s another metric that matters: the temperatures of roads, sidewalks, buildings, parking lots and other outdoor surfaces. Hot surfaces can make the places people live and work more dangerous, and can increase the risk of contact burns.

Just consider this image, captured recently by satellite, of surface temperatures across Phoenix.

**Phoenix** July 10, 2024

LAND SURFACE TEMPERATURES



Sources: U.S.G.S. and NASA Landsat via Google Earth Engine; U.S. Census. • Note: Satellite image taken at 11:03 a.m. local time. Higher-uncertainty pixels removed.

Around noon on July 10, huge parts of the nation's fastest-growing large city were 120 degrees Fahrenheit, about 49 degrees Celsius, or hotter to the touch. Had you been unlucky or unwise enough to actually touch one of these surfaces with bare skin, it could have caused injury within minutes.

On the city's desert fringes, in territory governed by Native American nations, the land was even hotter, 150 degrees or more.

So far this summer, the Arizona Burn Center, which serves Phoenix and the broader Southwest, has admitted 65 people for severe heat-related burns, according to Dr. Kevin Foster, the center's director. Six of these people died from their injuries. Last summer, the center recorded 14 such deaths.

Yet even that figure is small compared with the 645 heat-related deaths that were identified last year in Maricopa County, which includes Phoenix. That was the highest number on record for the county. (This year, the county has so far reported 23 heat-related deaths and is investigating 322 more.)

Surface temperatures are just one of many factors that cities are thinking about as they try to protect residents from extreme heat, said Ladd Keith, an associate professor in the School of Landscape Architecture and Planning at the University of Arizona.

In an environment as complex as a city, heat can harm people, pets and wildlife in many different settings and circumstances, Dr. Keith said. For officials, it can be tricky to figure out which exact combination of policies and actions might prove most beneficial to public health.

Phoenix, for instance, is trying to plant more trees and increase shade. The city's "Cool Pavement" program has treated 120 miles of asphalt to help it reflect more sunlight and stay cooler as a result. But from a cost-benefit perspective, might it make more sense to put those resources toward building more heat-tolerant homes or addressing homelessness instead? "It's really hard to know what that mix is," Dr. Keith said.

What's clear, he said, is the need to figure it out quickly. "Heat deaths are climbing faster than any of our investments to prevent them," he said. And human-caused global warming keeps increasing the frequency and intensity of dangerous heat waves. "We're chasing a moving target very slowly," he said.

**Sacramento** July 11, 2024

LAND SURFACE TEMPERATURES

120°F      130°F      140°F      150°F



Sources: U.S.G.S. and NASA Landsat via Google Earth Engine; U.S. Census. • Note: Satellite image taken at 11:45 a.m. local time. Higher-uncertainty pixels removed.

Sacramento is known, with pride, as the City of Trees. But tree cover isn't distributed equally there, and neither is exposure to broiling heat. On the northern and southern sides of California's capital, residents of low-income neighborhoods have long contended with a shortage of shade and green space on sweltering days like last week's.

Victoria Vasquez is the grants and public policy manager for California ReLeaf, a coalition of nonprofit groups that protect and grow the state's urban forests. Funding for such work is always tight, Ms. Vasquez said. That hasn't changed very much even as the West suffers through more and more record temperatures. "I wish that it did," she said.

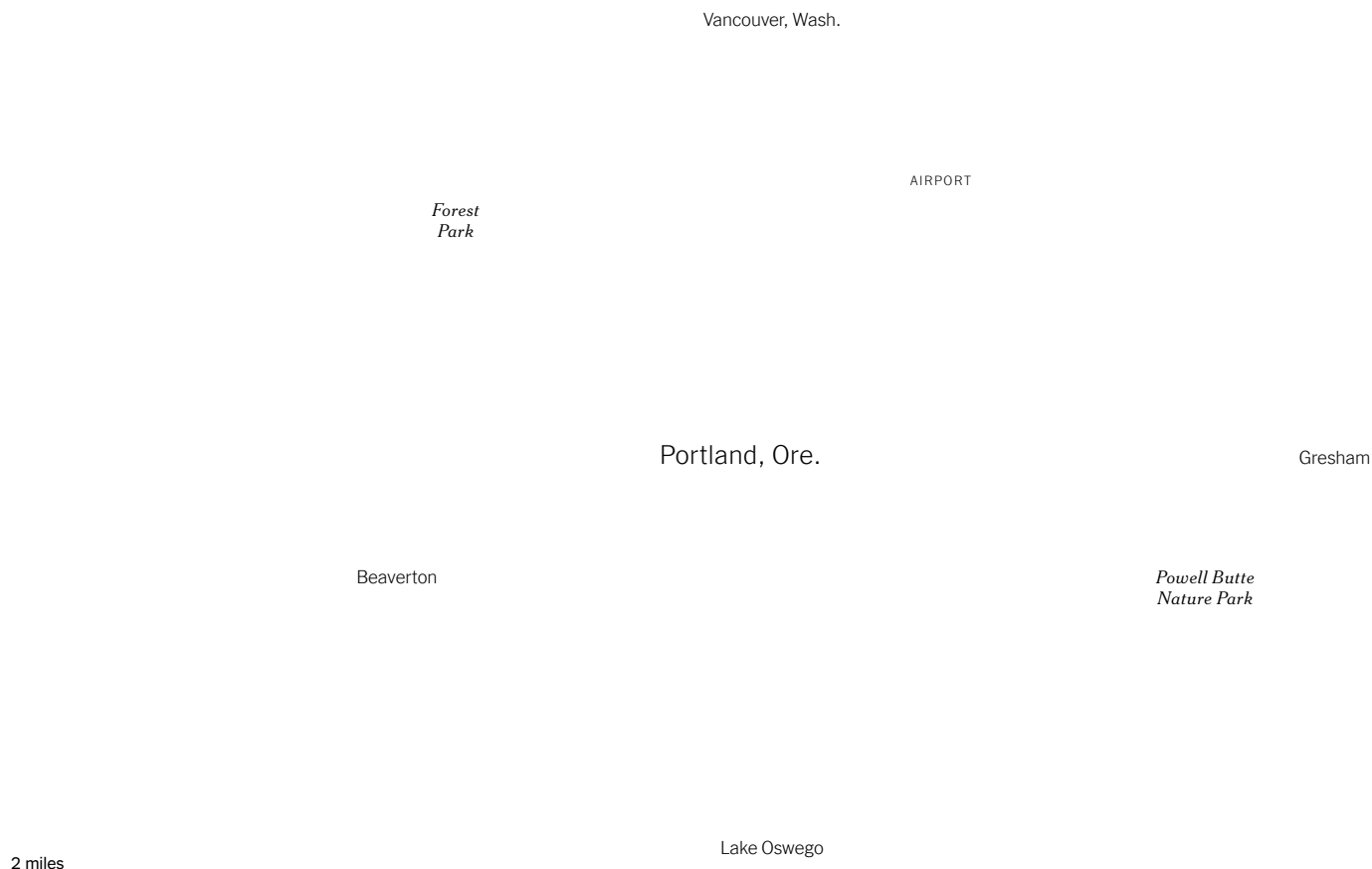
Still, she sees signs of movement in the right direction. Sacramento is considering a plan to increase citywide tree cover to 35 percent from 19 percent by 2045. Under the Inflation Reduction Act, the United States Forest Service received \$1.5 billion to support urban forest programs.

When neighborhood associations see how quickly they can reap the benefits of planting and maintaining trees, Ms. Vasquez said, “that is an infectious, positive change.”

**Portland, Ore.** July 9, 2024

LAND SURFACE TEMPERATURES

120°F      130°F      140°F      150°F



Sources: U.S.G.S. and NASA Landsat via Google Earth Engine; U.S. Census. - Note: Satellite image taken at 11:55 a.m. local time. Higher-uncertainty pixels removed.

In Portland, Ore., tree-filled areas like Forest Park, on the city’s west side, provided oases of cool last week. Yet Vivek Shandas, a professor of urban planning at Portland State University, and his colleagues recently discovered that the city’s overall tree cover decreased somewhat between 2014 and 2020. One likely culprit? Trees are often removed when houses are sold and residential areas redeveloped.

The medical examiner’s office in Multnomah County, which includes Portland, said last week that it was investigating five deaths for links to the recent blistering heat.

In many ways, Portland has become much more attuned to heat threats ever since a heat dome killed hundreds of people in Oregon and Washington in the summer of 2021, Dr. Shandas said. The city is communicating the risks more actively. It has provided portable cooling units to low-income residents. Still missing, Dr. Shandas said, are the changes to building codes and construction practices that would truly ready Portland for the hotter years and decades to come.

“The things that are low-hanging fruit right now, I think have pretty much been picked,” he said. “The longer-term, sustained, deep retrofit that the city needs in order to be prepared for the increasing intensity and frequency of these heat waves? I have yet to see any of that.”

*A correction was made on July 19, 2024: An earlier version of caption information with a satellite image of Phoenix stated incorrectly the time at which the image was taken. It was 11:03 a.m. local time on July 10, 2024, not at 12:03 p.m.*