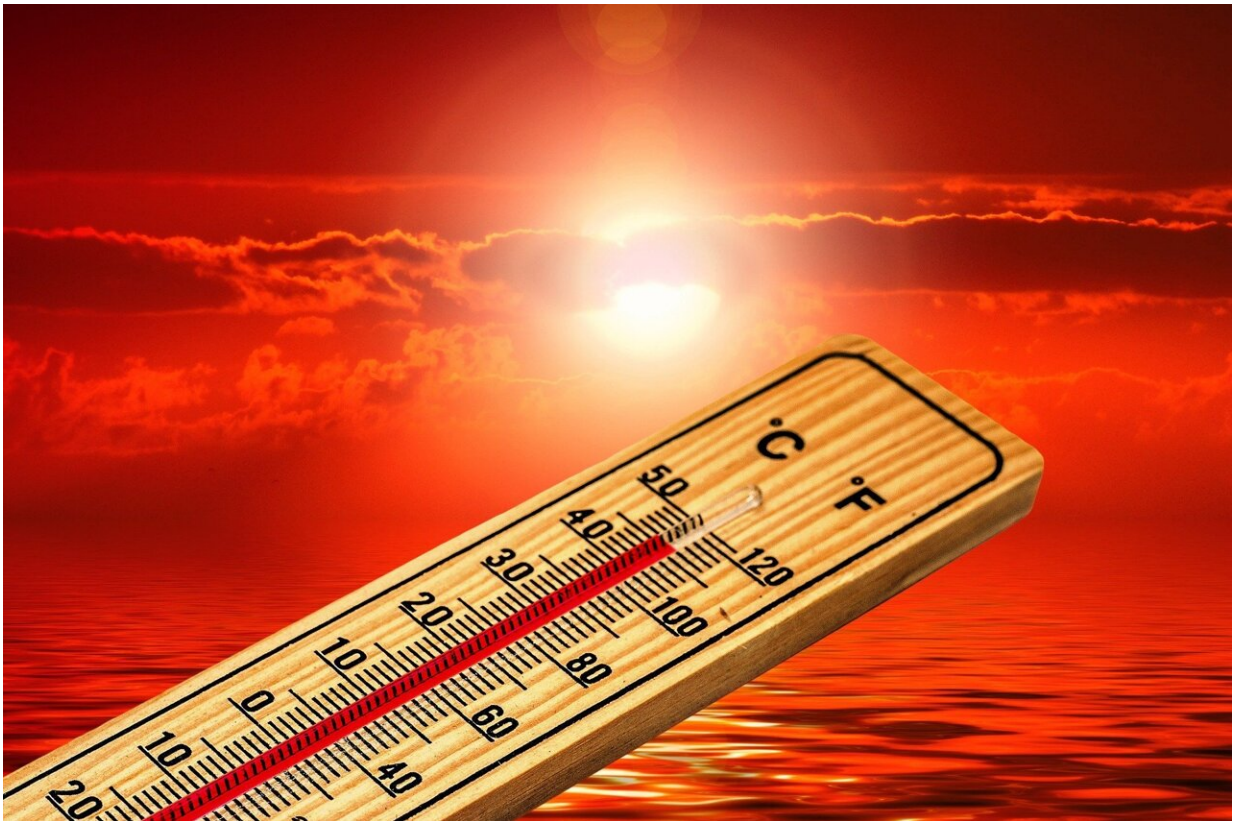


Extreme heat is a problem in Virginia: Researchers want to help

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The summers in Hampton Roads, Va., are hot, but for some residents, swelling temperatures and their impacts can be disproportionately worse.

In Portsmouth, Va., for example, a lack of green space and increase of development over time has created urban heat islands, said Elizabeth Malcolm, professor of ocean and atmospheric sciences and director of sustainability at Virginia Wesleyan University.

Urban heat islands occur when cities replace natural land cover with dense concentrations of pavement, buildings and other surfaces that absorb and retain heat. This effect increases energy costs, air pollution levels and heat-related illness and mortality.

"Remember when you were little and you were walking barefoot outside, and the grass was so much cooler than the the blacktop? So part of it is that change in albedo (reflective power), so the darker surfaces just absorb more sunlight and they retain the heat," Malcolm said.

"Also, the soil and the plants are also cooled by evaporative cooling—just like sweat cools our skin. When [soil moisture](#) evaporates or the plants are transpiring, you can get evaporative cooling.

"(In) urban areas, some of our processes like air conditioning and building release heat, so there's also anthropogenic heat released into the environment in urban areas."

Faculty at VWU received a grant to complete a two-year project to combat rising temperatures in Portsmouth. The first year will focus on mapping hot spots within the city's limits, and the second year will focus on community input from residents about [tree planting](#) and other efforts.

Malcolm said [policy choices](#) such as redlining have had lasting environmental impacts on Portsmouth. The University of Richmond has gathered maps and data related to redlining in cities in Virginia and beyond, including Hampton Roads.

An Environmental Protection Agency review of several studies found that some communities in the United States, particularly those that are [low-income](#) and with higher populations of people of color, have neighborhoods with higher temperatures relative to adjacent neighborhoods.

"Decisions that might have been made decades ago that affected how dense or how developed an area is—where the green spaces are or where they aren't—all have implications today for the health and well-being of the people who live in that neighborhood," Malcolm said.

Reducing [urban heat islands](#) also can have economic and social effects, Malcolm added. A 2023 report from Rockefeller Institute of Government, a public policy research arm of the State University of New York, notes research reflected that the prevalence of trees in public right-of-ways are associated with lower crime rates. Other studies suggest reducing heat islands brings in development and lowers energy costs.

Extreme heat is the most dangerous weather event in terms of death, surpassing tornadoes, hurricanes and other severe storms, according to the National Weather Service. Each year, extreme heat events contribute to hundreds of deaths in the United States. Vulnerable populations, such as children, [older adults](#) and those with preexisting conditions become even more at risk as temperatures increase.

Garry Harris, a Portsmouth native and president of the Center for Sustainable Communities, said focusing on heat reduction can improve the lives of those who rely on being outside for jobs and for general quality of life since summers are only getting hotter due to climate change.

"(The project is for) the folks out there on the tarmac who are directly in

those places, becoming dehydrated and falling ill," Harris said. "It's about gridlock. It is the single air conditioner in our homes, and if it goes out, you suffer. It's about those older folks who live in those redlined areas and (face) other housing injustice practices."

Community engagement in the project is going to be a major focus, Harris said. He said the group has already begun reaching out to civic leagues and religious groups, and making connections with residents about sustainability and taking care of the land will make community members more excited and engaged in the project. Harris said [community engagement](#) is the key to more [sustainable communities](#) and longevity.

"They experience on a daily basis particulates and those contaminants that the children are inhaling. Now, we layer on top of that: health disparities, [respiratory diseases](#), blood disease and heart disease," Harris said. "We layer on economic disparities, loss of jobs or no jobs (and) housing injustice. On top of that, we have severe weather, [extreme heat](#). That's what those communities are facing. That's what those people are facing.

"Planting trees is going to do something to help that out, but we're really proud of these folks that leap beyond that to do what's necessary to make their communities more sustainable and resilient for our residents."

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