

Mapping Heat Vulnerability to Protect Community Health

By Kelly McCarthy and Zack Valdez - 5 April 2019

Community leaders and scientists from two U.S. cities are combining public health data and heat maps to prepare residents for climate change–related health risks.



Climate change is expected to disproportionately affect vulnerable populations, such as the elderly, young children, families living in poverty, and people with chronic diseases.

Residents of Missoula, Mont., created a heat vulnerability map to prepare residents for health risks associated with climate change. Credit: Courtesy of Destination Missoula

As the global community celebrates World Health Day on 7 April, at AGU we want to highlight projects in two U.S. cities striving to make climate-related health information accessible at a local scale. Confronted with increased health risks to humans resulting from climate change, leaders within these communities are developing tools at the grassroots level to inform city planning, address needs for services, and identify areas for green infrastructure and cooling interventions.

Like many health threats, climate change is expected to disproportionately affect vulnerable populations, such as the elderly, young children, families living in poverty, and people with chronic diseases. From small rural cities to densely populated metropolitan centers, communities are developing resiliency efforts to ameliorate these escalating threats and inform local decision-makers.

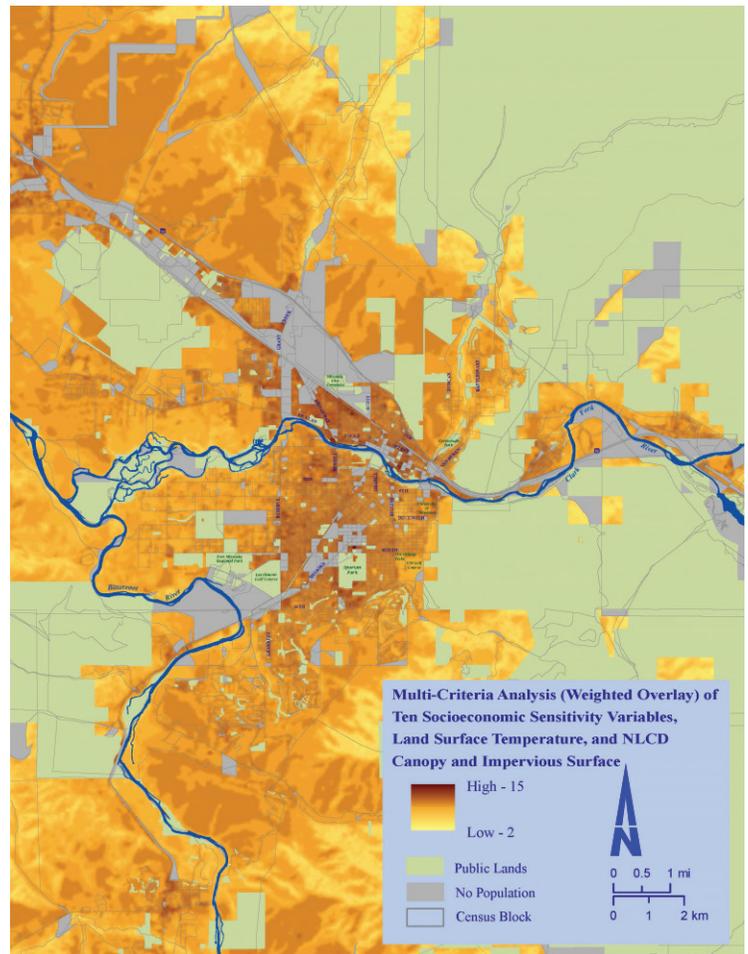
In a small but growing urban center surrounded by ranching communities in western Montana, increased temperatures and threats to air quality are exacerbated by hot spots contributing to the urban heat island effect. Chase Jones and Amy Cilimburg, community leaders in Missoula, recently partnered with a team of scientists through the Thriving Earth Exchange to take steps toward providing evidence-based recommendations to urban planners and policy makers to address sensitive areas within their community.

By overlaying U.S. Census demographics for sensitive populations with heat exposure variables, the team successfully mapped the vulnerability down to individual city blocks. “Because we have forced the data to this fine scale, city planners and health department officials are able to see where vulnerability may vary within a neighborhood and focus immediate efforts there,” said Julie Tompkins, a graduate student at the University of Montana and member of the science team. The group has used the map to provide recommendations for city building codes that should alleviate the urban heat island effect.

Tompkins, along with her adviser, Anna Klene, expects that this type of tool will inform urban planning as climate change-related health needs continue to grow. “This project has been presented to governmental, health, and environmental groups. The feedback we received has been positive toward data-based identification of specific areas for services,” said Tompkins. This project extends and enhances the work of Missoula’s Summer Smart program, which aims to prepare the community to thrive amid increasing summer wildfire smoke and heat by helping Missoulians to be physically, mentally, and economically healthy and resilient.

As the Missoula team continues to share their findings with policy makers and their community, residents in a South Bronx, N.Y., neighborhood are leading grassroots resiliency planning with similar outcomes in mind. The Hunts Point Heat Project team, another Thriving Earth Exchange partnership, wants to inform the community about extreme heat and urban heat island effects while equipping them with tools and skills to influence green infrastructure planning. Like the Montana initiative, this project will identify hot spots within the community and make that information publicly available through maps and other channels, allowing the community to intervene and advocate for themselves.

“In the case of extreme heat here in Hunts Point, community leaders understand that ‘urban heat island’ is an issue, and that our community is very heat-vulnerable due to high heat exhaust from local industries and diesel-fueled trucks but also due to our low vegetative surface coverage,” said Fernando Ortiz, the climate preparedness and resiliency organizer at the Point Community Development Corporation. Ortiz has partnered with atmospheric scientist and remote sensing specialist Brian Vant-Hull and ISeeChange director Julie Kumari Drapkin. They plan to integrate data regarding land use and land cover, air temperature, surface temperature, and demographics into an extreme-heat vulnerability map hosted on an online dashboard. The information can be used to improve the community’s ability to respond to extreme heat, identify target areas for mitigation activities,



A heat vulnerability map developed by the Missoula, Mont., Thriving Earth Exchange project team. Click image for larger version. Credit: Julie Tompkins

and drive potential policy changes in the future. “Working with scientists allows us to better understand how we can accurately measure heat and map it to create efficient and effective interventions and recommendations,” said Ortiz, “and better prepare and educate our community about staying cool.”

As the threat of health risks associated with climate change becomes more significant, community-led resiliency efforts and partnerships with scientists can influence decision-makers with evidence-based recommendations that will protect their communities from the worst effects of climate change.

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Fernando Ortiz (far right), climate preparedness and resiliency organizer at the Point Community Development Corporation and part of the Hunts Point Heat Project, teaches residents about individual preparedness at a public outreach event. Credit: Courtesy of Fernando Ortiz