

Studying Extreme Weather Event Impacts for Transit Reliant Unhoused Populations

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Introduction

As climate change increases the frequency and severity of extreme weather events, people experiencing homelessness face growing risks from heatwaves, storms, flooding, and cold weather. In Santa Clara County, many unhoused individuals rely on public transit, walking, and bicycling to access essential services, including emergency warming and cooling centers. Yet little research has examined how transportation accessibility affects the ability of unhoused populations to reach safety during extreme weather events.

This study explored the relationship between transportation, emergency weather services, and homelessness in Santa Clara County. The primary goal was to identify barriers that prevent unhoused individuals from accessing weather-respite facilities and other emergency resources during extreme weather events. By combining geospatial analysis with interviews of unhoused residents and input from homeless service providers, the study examined how transportation systems, service locations, communication networks, and social factors influence climate resilience among transit-reliant unhoused populations.

Study Methods

The study used a mixed-methods approach that combined geospatial analysis with qualitative and quantitative data collection. First, researchers mapped homeless encampments, transit stops, warming and cooling centers, emergency shelters, and other weather-related services throughout San José. Geographic accessibility was analyzed using Cluster and Outlier Analysis (Anselin Local Moran's I) to identify statistically significant patterns of service access. In other words, the analysis helped

pinpoint neighborhoods where people experiencing homelessness are most isolated from transportation and safe places to seek shelter during extreme weather. These locations were designated as service gap areas where unhoused residents face greater difficulty reaching transit and emergency weather services. Second, the research team conducted 120 semi-structured interviews with people experiencing homelessness at 12 encampment locations in San José and one encampment site in Gilroy. Interviews explored transportation habits, experiences during extreme weather events, use of warming and cooling centers, access to emergency information, and barriers to obtaining services. Responses were analyzed using descriptive statistics and thematic coding. In other words, researchers examined both numerical trends and common themes that emerged from participants' experiences and perspectives.

Third, researchers gathered perspectives from homeless service providers through an online survey and focus group. Participants represented organizations serving unhoused populations across Santa Clara County. Discussions focused on transportation challenges, emergency shelter access, communication systems, transit pass programs, and opportunities for improving emergency response. Combining geospatial analysis with lived-experience data allowed the research team to identify both physical barriers to service access and the behavioral, operational, and social factors that influence whether unhoused individuals are able or willing to use available emergency resources.

Findings

The study found that transportation plays a critical role in determining climate resilience among unhoused

populations. Many unhoused residents rely heavily on public transit and active transportation modes such as walking and bicycling. Transportation barriers were frequently cited as obstacles to accessing essential services and emergency shelters. Geospatial analysis identified significant spatial inequalities in access to transit and weather-respite facilities across San José, revealing concentrated service gap areas where accessibility is limited.

Improving climate resilience for unhoused populations requires a coordinated approach that integrates transportation planning, emergency management, homelessness services, and community-based outreach.

Interviews revealed that residents living along urban streams experience flooding more frequently than heatwaves. While stream corridors may provide cooling benefits during hot weather, they also expose residents to recurring flood risks, property loss, and emergency evacuations. The study also found that access barriers extend beyond physical distance. Many unhoused individuals reported avoiding emergency shelters because of concerns about safety, privacy, overcrowding, theft, stigma, pet restrictions, and uncertainty about shelter availability. As a result, most interview participants reported remaining outdoors during extreme weather events rather than seeking refuge in warming or cooling centers.

Communication challenges further increase vulnerability. Many respondents lacked reliable access to mobile phones or data plans, limiting their ability to receive emergency alerts. Service providers reported that weather warnings often arrive too late and that information is frequently inconsistent across agencies. Finally, the analysis identified faith-based organizations as an underutilized community resource. Several are already located within identified service gap areas but are not formally integrated into the county's emergency weather response system.

Policy/Practice Recommendations

The findings suggest that improving climate resilience for unhoused populations requires stronger integration between transportation planning,

emergency management, homeless services, and community-based organizations. Transportation agencies should be recognized as essential emergency-response partners during extreme weather events. Transit agencies can improve access by expanding awareness of fare waiver programs, streamlining distribution of transit passes, improving service to emergency shelters, and extending service hours during weather emergencies.

Emergency response strategies should be designed around the lived realities of unhoused populations. Policies that accommodate pets, personal belongings, privacy concerns, and safety needs are likely to increase utilization of emergency shelters and weather-respite facilities. Local governments should also strengthen communication systems by partnering with trusted service providers and outreach workers who are often the most effective messengers during emergencies. Finally, Santa Clara County should consider formal partnerships with faith-based organizations and other community assets located within service gap areas to expand emergency shelter capacity and improve access during extreme weather events.

About the Authors

Costanza Rampini is an Associate Professor at San José State University whose research examines climate adaptation and the impacts of environmental change on vulnerable communities. Serena E. Alexander is an Associate Professor at Northeastern University whose research focuses on transportation decarbonization, climate resilience, transportation equity, and policy-relevant planning research. Jeff Wootton is a Transportation Planner at Santa Cruz METRO and a GIS researcher whose work focuses on transportation planning, accessibility analysis, and climate resilience. Amruta Gandhi is a graduate student in Urban Planning at San José State University whose interests focus on the intersection of housing, transportation, and equity.

To Learn More

For more details about the study, download the full report at <https://transweb.sjsu.edu/research/2545>



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