Understanding Heat in North Austin, TX

Go! Austin/Vamos! Austin (GAVA), the City of Austin, UT Health of the University of Texas at Austin

Introduction

In the U.S., heat waves harm more people than all other natural disasters combined. A changing climate means that heat waves are increasing. Those with the least resources, including infants, the elderly, people experiencing homelessness, low-income communities, and people with chronic or mental illness, are most at risk. Austin's Eastern Crescent communities experience the severe heat, especially areas lacking adequate parks and mature tree canopies. They share their stories and ideas to inform various heat solutions and organize to move their goals forward. These community leaders work with nonprofits, planners, public health officials, and urban foresters to reduce the impacts of urban heat to help their communities' climate resilience.

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Background: The Journey to Understanding Urban Heat

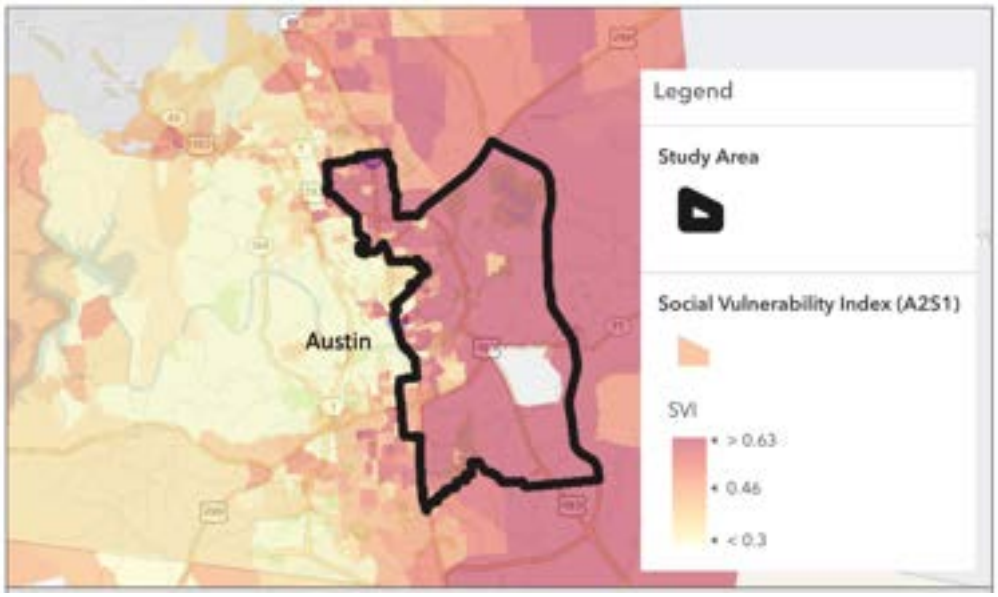
Back in 2020, University of Texas at Austin, Go! Austin/Vamos! Austin (GAVA), and the City of Austin worked together to create a map and understand how hot it gets in different parts of Austin, what it's like to live with it, and how it affects our health and activity.

These partners were funded by the National Integrated Heat Health Information System (NIHHIS) and the National Oceanic and Atmospheric Administration's (NOAA's) Climate Program Office. The City of Austin calls this project the Urban Heat Watch which is supported by CAPA Heat Watch project.

Maps of urban heat and social vulnerability identified focus areas for a heat campaign in Austin. Using data backed by community input, the Eastern Crescent communities were recognized as a priority area of focus for heat campaign efforts. Climate-induced weather events, such as extreme heat, have the most profound impact on those who live in the Eastern Crescent. Eastern Crescent residents experience increased levels of poverty, historical redlining, inadequate community planning, and disproportionate chronic health risks.

In Figure 1, data collected from Austin's Eastern Crescent, the area outlined in black, has a higher levels of stress impacting their health, shown in red and orange colors on the map, than other areas of Austin.

Figure 1: Map of Social Vulnerability in the Eastern Crescent



The research team, led by University of Texas at Austin Jackson School of Geoscience researchers, measured air temperature to produce a series of maps that the community helped create. This data also helped the team see where trees are, areas without shade, and locations of bus stops without shelters.

Their goal was to bring attention to areas within the city of Austin where people live with higher levels of stress impacting their health, experience high urban heat temperatures, and lack access to shade. The maps guided the team to focus on peoples' lived experiences with urban heat. These maps help the team develop strategies with the community to address urban heat.

Go! Austin/Vamos! Austin (GAVA) organized a community mapping event with the support of researchers and filmmakers, TAPI Story, in which residents were invited to

point out on big maps where they experienced heat, where they go to seek relief, what they need to be healthy and more comfortable during intense heat, and what specific locations they recommend.

Figure 2: A mother and her children map where they feel hot at the GAVA Heat Mapping Event held on September 20, 2022

Heat & Health

The future of heat in Austin

A heat wave happens when the maximum and minimum daily temperatures are hotter than normal for three or more days in a row. Heat waves were rare in the past in Austin, TX. In the future, it is expected that there will be six to eight heat wave events per year in Austin. Summers are expected to be hotter in Austin with increasing daytime temperatures beyond 110°F.

Health Impacts

Extreme heat can make people sick. Heat exhaustion or heat stroke happens when the body cannot properly cool itself. While the body normally cools itself by sweating, this might not be enough during extreme heat events. In these cases, a person's body temperature rises faster than it can cool down. This can cause damage to the brain and other vital organs.

Those most at risk of heat related illnesses include older adults, the very young, and people with mental illness and chronic diseases. However, even young and healthy people can be affected if they participate in strenuous physical activities during hot weather. Summertime activity, whether on the playing field or the construction site, must be balanced with actions that help the body cool itself to prevent heat related illness.

To help us understand the health impacts of Austin's heat, eighteen North Austin residents participated in in-person interviews during the summer of 2021. Those most affected by heat were children, those living with diabetes and high blood pressure. Heat caused tiredness, headaches, dizziness, faintness, trouble breathing, and nosebleeds. Additionally, those who work outside in the heat for a living experienced lack of appetite, tiredness and irritation.

Heat Mapping

National Oceanic and Atmospheric Administration Campaign

In coordination with CAPA, local organizers and volunteers drove pre-identified routes along the Eastern Crescent to collect thousands of temperature and humidity data points during the morning, noon, and evening on a typical summer day in Austin, which was held on August 7th, 2020. CAPA provided sensors and technical expertise for this event. Their goal was to:

1. Provide detailed descriptions of temperature and humidity

2. Engage local communities and create lasting partnerships to understand better and address the inequitable threat of extreme heat.
3. Bring together sensor and space technology with community climate action to better understand the relationships between the climate, the city, nature, and human beings.

Figure 3: GAVA Community Organizer Frances Acuña installing CAPA sensor on August 7, 2020

Figure 4: CAPA Heat Maps: In Figure 4 below, hotter air temperatures are marked by red and orange lines, while lower air temperatures are marked in white and blue.

6-7AM Heat Map 3-4PM Heat Map 7-8PM Heat Map

Team

Staff from the City of Austin's Office of Resilience continue to hold bi-weekly calls with city staff, GAVA staff, and University of Texas at Austin researchers on heat and air quality. City staff represent the Community Tree Preservation Division, Austin Transportation Department, Austin Public Health, and Homeland Security & Emergency Management. Additional partners include staff from CapMetro and community nonprofit, TreeFolks.

The following individuals have been key contributors to this work:

GAVA

- **Frances Acuña**, Lead Climate Resilience Organizer, Frances has worked on reaching out and building trust with residents, has conducted 20 1-1's with residents to gather their experience on urban heat, and participated in placing sensors in various locations in Austin.
- **Ucha Abbah**, Climate Resilience Project Manager, Manages the timeline and deliverables related to this project for GAVA

- **Tú-Uyên Nguyễn**, Climate Resilience Organizer, organizes with resident leaders to develop their leadership, cooperation, and advocacy to activate their heat adaptation priorities and implement heat mitigation strategies.

University of Texas at Austin / University of Texas Health

- **Kevin Lanza,** Assistant Professor, Kevin has led the work with in situ air temperature/relative humidity sensors and with processing and analyzing qualitative interview data on community perception of extreme heat, time spent on project
- **Dev Niyogi**, Chair Professor, worked on project coordination and overall urban heat and climate assessments
- **Harsh Kamath,** graduate student, Worked on Urban Heat Island Modeling
- **TingYu Dai,** graduate student, working on data regridding and data downscaling
- **R. Patrick Bixler**, Assistant Professor, Fellow to the Mike Hogg Professorship in Urban Management
- **Jessica Jones**, Social Science Humanities Research Associate, LBJ School of Public Affairs, University of Texas at Austin

City of Austin

- **Marc Coudert**, Environmental Program Manager, City of Austin, Office of Sustainability/Resilience: Leads the coordination between city staff
- **Phoebe Romero**, Former Environmental Program Coordinator, City of Austin Office of Sustainability: Led the city's air quality program and is coordinating the placement of sensors with transportation staff
- **Margaret Valenti**, Environmental Program Coordinator, Dev't Services Dept. Forestry: Helps with tree giveaways and tree coordinations

- **Alan Halter**, IT Geospatial Analyst Senior, Development Services Department. Forestry - helps map opportunities and potential interventions
- **Marcos Martinez,** Environmental Program Coordinator, City of Austin Development Services Department
- **Ashley Hawes**, Epidemiologist, Austin Public Health: Provides input and coordination with public health efforts
- **Connor Lynd,** Epidemiologist, Austin Public Health
- **Sophia Benner,** Street Design Project Coordinator, Active Transportation & Street Design Division, Transportation and Public Works Department, City of Austin. - worked on pedestrian facilities, improving access to transit, and even including rain gardens in our bikeways designs
- **Kelsey Vizzard**, Senior Planner with the Transportation and Public Works Department, City of Austin - helping coordinate the work with the Austin Strategic Mobility Plan

Community Engagement

Community Engagement with directly-impacted residents was conducted to ensure communities of color with low-income were able to share their lived experiences of heat and advise on proposed solutions and prioritization of heat mitigation strategies. Using a ‘no data without stories, no stories without data' approach helped to develop an authentic equitable process and final report guided by resident leadership.

Go! Austin/Vamos! Austin (GAVA)

GAVA is a coalition of neighbors and community partners breaking down barriers to healthy living and strengthening neighborhood stability in Austin's Eastern Crescent (Dove Springs, South Austin, the Rundberg area, and the St. Johns neighborhood).

GAVA was funded ($40,000) to capture qualitative data (lived experience) from community members most vulnerable to extreme heat and communicate the findings in a publicly accessible medium. The contribution will fund an engagement process to

combine the heat data from the August 7th heat mapping campaign with qualitative data/storytelling to better characterize the risks of the urban heat island effect and poor air quality on low-income communities and communities of color. The information will inform heat mitigation strategies such as tree planting, cooling centers locations, and other green infrastructure elements in the Right of Way. While the primary focus of this work will be to understand how heat affects communities, questions and conversations on air pollution will be incorporated since "ozone season" corresponds with hotter months. Both air quality and heat are interconnected as community concerns and exacerbating factors to health and mobility in a changing climate.

GAVA provided the following services:

- **Community engagement plan:** The contractor is responsible for designing an inclusive and transparent community engagement process. Output: Create a document outlining method(s) to select community members, questions to ask, response analysis, and potential communication medium.
- **Interview response:** Conduct interviews with community members on the negative impacts of heat in their community. Analyze the response and compile the results into a summary document.
- **Mapping:** Facilitate discussions with community members on site-specific heat trends and create a public-facing map that captures the feedback.

Outreach

Resident leaders in the Rundberg and North Lamar area gave interviews to GAVA staff so they could share their lived experiences of heat in Austin. Residents also shared the solutions that will best mitigate heat where they live, work, learn, play, and pray.

2022 Community Events

Kick-Off On May 31st, the team and residents came together for a kick-off meeting to connect after the community interviews, provide a summary of themes during the

interviews, and provide a roadmap of next steps with the project. The roadmap outlined a series of community discussions throughout the summer of 2022.

As a result of the interviews, seven prominent themes emerged:

- Residents were hot when traveling outside, walking to school, and working construction.
- The most affected by heat were children and those with diabetes and high blood pressure.
- Physically, heat caused tiredness, headaches, dizziness, faintness, and trouble breathing.
- Mentally, the heat was uncomfortable and bothersome.
- To adjust to the heat, residents drank water, used air conditioning (AC), didn't go outside, and changed their schedules.
- Barriers to being comfortable included the cost of AC and the lack of trees and other shade.
- Residents would like more trees, parks, water bodies, and water fountains to combat the heat.

During this meeting, the City of Austin team members communicated that they were excited to continue working with residents to understand the solutions they wanted to see. Filmmakers from TÁPI Story announced their partnership with GAVA to develop a film focused on the lived experiences surrounding heat in Austin. Residents began to express their desires for trees, fruit trees, bus shelters, water fountains, solar panels, splash pads, kiosks with bottled water, misters, sunscreen for community events, and how they might be able to get their apartments to participate.

In June 2022 GAVA hosted a virtual community discussion. Some of the issues mentioned included:

- Residents felt a need for general safety, trying to utilize parks at night when it's much cooler; some requested better lighting and patrols. For many families

visiting parks at night was an opportunity to get their kids out to be active. Still, they feel safer in their neighborhood parks at night.

- Water features like splash pads were requested so that kids could go out and play during the daytime.
- Pre-existing health conditions like asthma, allergies, rheumatoid arthritis, and high blood pressure were aggravated by the extreme heat. Some children with autism were more irritable when exposed to this heat.
- Some residents could not find respite in their homes as their air conditioning units were ineffective, making it difficult to sleep.
- Some residents had spouses who worked jobs that forced them to be outside in the extreme heat for long periods, like construction, which meant they came home suffering from heat exhaustion.

In July 2022, several residents had asked how they could implement strategies for coping with heat stress into their neighborhoods; splash pads came up repeatedly. In response to these requests, GAVA brought in Mali Calvo from the City of Austin's Parks and Recreation Department to explain what it would take for residents to take on a neighborhood project. Marc Coudert presented on the city process and barriers like time and bureaucracy that can slow down projects.

Resources were shared by the team included:

- Austin Energy's weatherization program
- Fans provided to eldercare
- Home Performance with Energy Star rebate program
- Tips for clothing that supports living in extreme heat

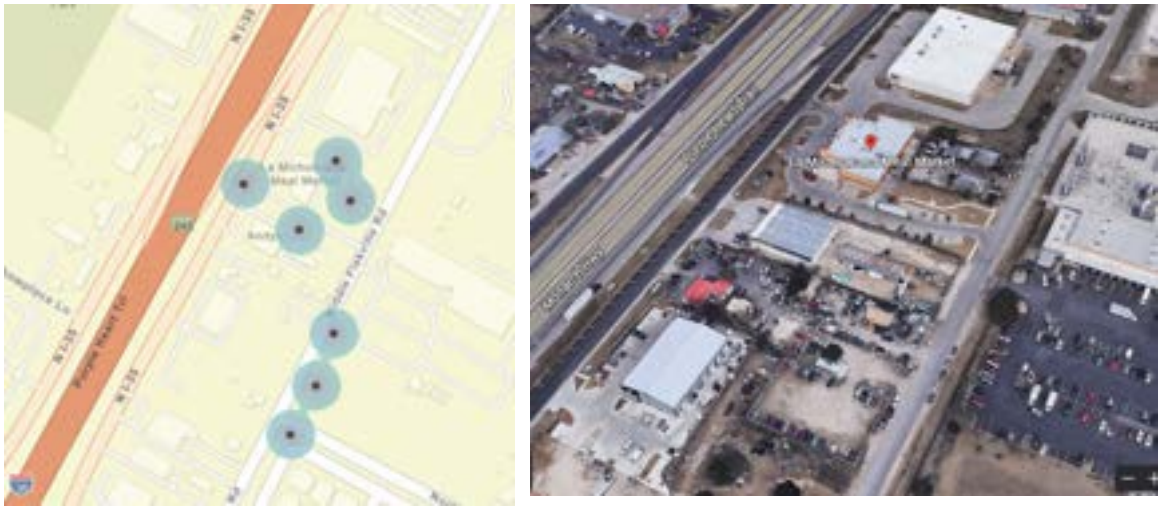
In September 2022, GAVA hosted a meeting as the culmination of the meeting series. The meeting was hosted in-person at a local recreation center and focused on learning about lived experiences including: where community members experienced heat, what kinds of interventions they would like to see at those locations, and where they went to

deal with heat stress. Community members identified these locations and data points by placing coded stickers on large, printed maps of the North Austin neighborhood, St. Johns, and neighborhoods along Rundberg Lane. The stickers were then digitized into layers of data by city staff who placed each point on a digital version of the maps. This data was analyzed for “hot spots” or clusters, where many residents identified similar locations where they experienced extreme heat, or where there were common strategies identified by community members in certain areas.

Below are some of the findings from that event:

- When asked what kinds of interventions they would like to see and where residents flagged 108 water fountains, 67 trees, 40 bus shelters, and 11 Parks/Gardens.
- There were clusters indicating extreme heat was experienced by several residents at a Walmart in North Austin, Dobie College Prep Academy, Hart Elementary School, and La Michoacana Meat Market.

Figure 4: Community identified hot areas near 9811 N Interstate 35 Frontage Rd, 78753



2023 Community Events

In March 2023, GAVA hosted a meeting focusing on resident-driven solutions. The team reconvened with residents to present the findings from the September 2022 meeting.

The goal of this meeting was to understand from residents what high priorities are from the list of interventions they built months prior. We asked them what they would like to see in their neighborhoods as soon as possible, their capacity to lead the effort to get these things in their neighborhoods, and what skills they might want to develop further to lead these efforts. Frances Acuña provided more detailed information on weatherization so that these residents could verify their eligibility.

Many residents expressed urgency in having water features and other methods for coping with extreme heat in their neighborhoods. They were excited to step up in whatever way they could because they saw value in having these things not just for themselves, but for their children.

As the project comes to a close, we have been working closely with residents to understand their priorities so that we can work on developing short, medium, and long-term goals. Residents prioritized trees, water fountains, splash pads, bus shelters, and parks/gardens during this meeting. Afterward, residents were asked to prioritize locations for each of these interventions. The data is undergoing analysis by the team and hope to continue working with our partners on building this into a matrix of short, medium, and long-term goals that are ranked into high, medium, and low priority. GAVA looks forward to continuing as the leadership and organizing body for residents to continue building direct relationships with city staff and to make progress with the solutions they have identified. We also look forward to seeing our partners work at an institutional level to support residents as they face barriers trying to implement their projects.

Results

What was accomplished under these goals?

We have educated residents on the various methods for coping with the heat, connected them to the relevant departmental staff for implementing local projects, engaged them in existing programs and methods already available to them (like home weatherization), and gathered data on a map about where they experience the most impacts of heat and the specific interventions they would like to see at those sites. We synthesized that data into and brought it back to residents so that they could highlight what from those lists are high, medium, and low priorities, and identify residents who are ready to lead projects related to issues that surfaced, like tree plantings and advocacy for splash pads. A number of community members are ready to lead the way and we have created a matrix to clearly identify the projects that are short-term and high priority as well as medium/ high priority and long-term.

How were the results disseminated to communities of interest?

Results were communicated to North Austin residents through a series of virtual presentations and feedback sessions during this grant and partnership collaboration. GAVA promoted these sessions through resident Climate Navigators who are well connected in their neighborhoods, and promoted the events through social media channels. We intend to continue building strong communication channels between the City and residents who are taking ownership of a variety of short and long-term projects.

What will you do to accomplish goals and objectives during the next reporting period?

As the project comes to a close we have been working closely with residents to develop short, medium, and long-term goals. There is a lot of data to analyze and continue sharing to inform the matrix of short, medium, and long-term goals ranked by priority. GAVA looks forward to continuing to support community leadership, building direct relationships with city staff to move the solutions forward, as institutional partners collaborate to troubleshoot the barriers they face trying to implement their projects.

Implementation & Future Opportunities

Based on community feedback, residents supported by GAVA and other community advocates can employ the following strategies in collaboration with institutional stakeholders from the City of Austin and community partners, using guidance from this and previous engagement activities, to support residents facing negative impacts from extreme heat:

1. **Greening - Reducing urban heat with green space and vegetation**
   Stakeholders: Treefolks, Austin Independent School District, City of Austin Departments (Austin Transportation Department, Development Services Department, Public Works Department, etc), CapMetro, University of Texas, GAVA
   a. **Tree Planting and Care**
      i. Goals/Results:
         1. More trees planted to increase the urban canopy along Rundberg Lane and other corridors of North Austin, where residents have already identified need for shade coverage
         2. More trees are planted in community spaces such as at K-12 schools, recreation centers, and private businesses
         3. Trees are watered along corridors to schools, emphasizing maintenance during the first three to five years. (mulching, watering, pruning). work with DSD Forestry to map spaces where trees should be planted
   b. **Neighborhood Parks, Gardens, and Green Spaces**
      i. To synergize with increased tree canopy reducing the urban heat island effect and make it cooler, safer, and more comfortable for residents to exercise, commute, and enjoy their neighborhoods

2. **Infrastructure Improvements** - Resident leaders collaborate with city departments to advance their heat adaptation goals related to transportation, physical activity, and recreation, as described below.
   Stakeholders: Treefolks, AISD, COA Depts (PARD, ATD, DSD, Corridor, PWD, etc), CapMetro, University of Texas, GAVA

   a. **Bus Shelters and Benches**
      i. The Office of Resilience of the City of Austin and CapMetro
         1. Augment criteria of locating bus shelters, benches, and splash pads to include Social Vulnerability Index metrics, comfort, and community feedback
      ii. GAVA Resident Leaders engage in advocacy:
         a. for improvements of pre-existing bus stops at locations already identified by residents to equip bus stops with a bench and bus shelter if they don't have them already
         b. for new bus stops on existing bus routes to decrease exposure to heat having to walk between stops
   b. **Water Fountains**
      i. More access to water and hydration for residents who commute, exercise, and engage in recreational activities outdoors, prioritizing the preferred locations that have already been identified
   c. **Splash Pads**
      i. For safe and cooling summer activities for children and adults
      ii. To improve access to cooling sources of water at recreation centers and neighborhood parks at preferred locations residents have already identified and where pools are not available
   d. **Rest Areas**
      i. To serve as a rest and hydration center and additional green space

for residents who work, play, pray, and in GAVA-supported zip codes but have to commute from the greater metropolitan area and can be exposed to additional heat stressors while driving, taking the bus, etc.

3. **Weatherization:** Residents can get connected to resources to weatherize one's home to maximize cooling and maintain safe internal air temperatures during heat waves. Residents can find out if they qualify for specialized programs and sign up themselves and their neighbors. In order to reach more communities of color and people from diverse and impacted communities, follow-up consultation will need to be available to residents in their preferred language, method of communication, and availability. Residents can be welcomed and invited to participate in these programs with increased outreach and community engagement informed by best practices and initiatives in diversity, equity, and inclusion.
   Stakeholders: Austin Energy, Housing & Planning, 311 / Code, Travis County

4. ***Explore collaboration on the creation of a City of Austin Heat Playbook***
   Consult with the residents to consider the value of a Heat Playbook to support the community vision and goals, based on the strategies above. Consider a printed physical hard copy guide for navigating extreme heat adaptation strategies, as well as a digital version that can be updated.

5. ***Engage organizations serving additional populations impacted by heat***
   Include the expertise of other community organizations and populations not included in this community engagement effort. GAVA particularly recommends engaging unhoused residents and organizations working directly with them, as well as community leaders living with disabilities, so that various directly impacted communities are informing these strategies and their implementation.