# Coproducing Opportunities to Advance Heat Resilience in Southern Arizona

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## Information Box

**Southern Arizona Heat Planning Summit**

What: Over 110 representatives from grassroots, non-profit, government, private sector, labor unions, utilities, and academic organizations in Southern Arizona convened and coproduced a list of gaps and opportunities to improve community heat resilience.

When: February 3, 2024

Where: Tucson, Arizona, U.S.A.

## 1. Introduction

Extreme heat events in the U.S. Southwest have become more frequent, longer, and intense over the last few decades (EPA 2023; USGCRP 2023), mirroring global patterns (IPCC 2023; Perkins-Kirkpatrick and Lewis 2020), and endangering the health of people and ecosystems (UNDRR 2020). In Southern Arizona, consisting of counties centered around Tucson Metropolitan Statistical Area (Pima County), heat-related fatalities have steadily increased over the last decade. In Pima County alone, heat-related fatalities reached a record of 176 in 2023, having disproportionately higher impacts on heat-stressed vulnerable groups like unhoused populations, undocumented migrants, and outdoor workers (Pima County Office of Medical Examiner 2023). Heat hazards will continue to magnify due to climate change. Under the high greenhouse gas emissions scenario, the number of days with temperatures higher than 100 degrees Fahrenheit in Pima County is projected to rise to 182 days, i.e., half of the year (USGCRP 2023). These escalating risks and compounding impacts on sensitive desert habitats, water security, air quality, and wildfire likelihood (USGCRP 2023), underscore the importance of local action.

Located in the desert of the U.S. Southwest, the City of Tucson, and the counties around the metropolitan area have a long history of engaging in heat-related issues. Tucson Water has hosted 14 annual Urban Heat Island workshops, disseminating knowledge on the latest best practices and resources to address extreme heat to city agencies. Leaders in Southern Arizona have also worked with regional and state coalitions to share information and resources on heat management and mitigation. Following the record-breaking heat in the summer of 2023, Arizona Governor, Katie Hobbs, declared an extreme heat emergency and



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issued an Executive Order to prepare a plan outlining specific lines of action to address extreme heat in the future. The Arizona Department of Health Services (ADHS) held a summit quickly in the fall of 2023 in Phoenix to understand statewide gaps and prioritize action items. While open to all state participants, the meeting attendance from Southern Arizona partners was limited due to the increased travel distance and limited timing. In response to state-level planning efforts and to advance the city and county's own ongoing heat planning efforts, the City of Tucson, Pima County Health Department, and the University of Arizona mobilized to organize the Southern Arizona Heat Planning Summit. The Summit was organized around four objectives:

1. To develop a knowledge base on current practices.
2. To diagnose opportunities to improve heat resilience.
3. To bring together local and regional partners to improve heat response, coordination, and mitigation efforts
4. To synthesize input for ongoing plans, specifically, Arizona's Extreme Heat Preparedness Plan and the City of Tucson's Heat Strategy.

## 2. Summit Organization

A first of its kind in Southern Arizona, the summit brought together representatives from grassroots, non-profit, local and tribal government, private sector, labor unions, utilities, and academic organizations across Southern Arizona, as well as expertise including public health, healthcare, emergency management, urban planning and policy, utility operations, first responders, university researchers, and neighborhood leaders from heat-stressed communities.

The full-day summit was held on Saturday, February 3rd, 2024, and began with a plenary session with presentations from the City of Tucson Mayor's Office, the city's Chief Resilience Office, the Pima County Health Department, and the University of Arizona to set the context. Facilitated breakout rooms followed the plenary centering on themes of public health and healthcare, community and neighborhood level action, energy and our grid, built environment, and workforce and heat protection. The themes draw on previously identified



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areas of input needed and represent key focus areas recommended for planning for urban heat resilience (Keith and Meeroow 2022).

Each breakout theme included a morning and an afternoon session. The morning sessions focused broadly on heat resilience with questions on existing and ongoing efforts, barriers in action, lessons learned, and general opportunities. The afternoon sessions were theme-specific, with questions about heat efforts and opportunities around public health and healthcare, community and neighborhood level action, energy and our grid, built environment, and workforce and heat protection (Figure 1). Participants attended breakout rooms of their choice. Between 15-20 participants participated in each session. Facilitated discussions, led by trained and experienced facilitators, were held in smaller groups of six or seven participants per breakout room. The sessions were steered by one or two theme experts from the summit planning team. Participant input was recorded during group discussions and shared with other groups in the breakout session. A general session at the end of the day outlined broad conclusions and next steps. Following the summit, recorded participant input was analyzed and coded as ‘successes’, ‘gaps’, and ‘needs’. Cross-cutting recommendations from all five themes were synthesized into seven key priorities.



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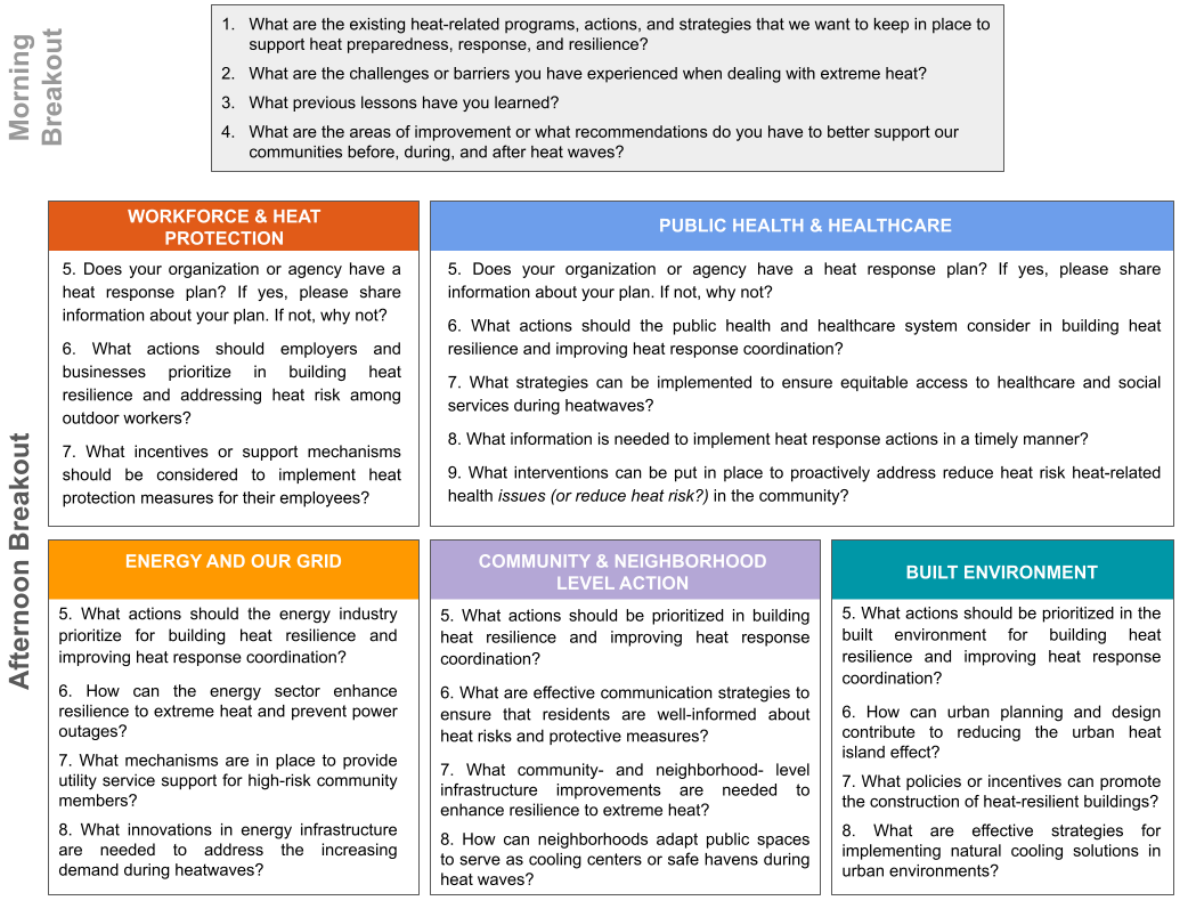


Figure 1: Questions asked during small-group structured breakout session discussion.

## 3. Findings

### *a. Successful Activities*

Summit participants identified various ongoing programs, resources, interventions, and partnerships to strengthen and continue.

First, in all five themes, education and training programs on heat risks, heat management, and heat mitigation were identified as successful. For example, the *workforce and heat protection* participants mentioned the importance of worker training and employee wellness programs; the *community and neighborhood level action* participants mentioned neighborhood preparedness workshops, including Physicians for Social Responsibilities' Building Resilient Neighborhoods training; *built environment* participants discussed how physical features like shade structures, and school gardens offer educational opportunities for school students; *public health and healthcare* participants mentioned programs like Beat the Heat messaging and 211 calls for accessing information about heat-related services.



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Second, participants discussed several city and county resources that provide financial and material support during heat emergencies. Participants mentioned free fare transit and cooling centers in most themes. Programs that provide financial and technical assistance to reduce utility bills, weatherize homes (e.g., Trico's Pima County Weatherization), and reduce energy and water usage (e.g., Community Home Repair Project of Arizona's efforts with Tucson Water to replace gas and water-intensive fixtures) were discussed as positive interventions. Initiatives that encourage cooling through green infrastructure were also mentioned by several participants (e.g., Tucson Electric Power's Trees for You, City of Tucson's Storm to Shade and Tucson Million Trees programs, and Composting beta program). Discussion on current physical policies and built-environment changes, beyond urban greening, (e.g., cool pavements, solar buses, water harvesting) and their benefits to long-term resilience (e.g., reduced surface temperatures, vehicular waste heat control, evapotranspiration, and drought reduction) was limited. Nevertheless, urban plans were broadly mentioned as useful resources, such as the city's Tucson Resilient Together, Pima County's Multi-Jurisdictional Hazards Mitigation Plan, and Pima County's Emergency Operations Plan.

Third, participants debated the importance of partnerships like the Heat Relief Network, Pima Climate Action Committee, faith-based networks (AZ Faith Network), and university-hosted programs such as the CDC-funded BRACE (Building Resilience Against Climate Effects), CLIMAS (Climate Assessment in the Southwest), a NOAA-funded Climate Adaptation Partnership (CAP), and NIH-funded SCORCH (Southwest Center on Resilience for Climate Change & Health), to not only understand heat risks, access novel information but also develop what participants called a "culture of care."

*b. Crosscutting Recommendations*

Participants also identified areas of improvement, priorities, and opportunities. Responses were synthesized into nine broad crosscutting areas of improvement, which we discuss using three heat resilience categories (Keith and Meerow 2022): heat management, heat mitigation, and heat governance.

Heat management included four out of the nine recommendations- improving outreach, expanding education, focusing on energy backup during heat waves, and refining cooling center operations. First, participants appreciated existing outreach programs but also recognized the need for better early warning systems and timely communication during heat



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waves. Discussions highlighted grassroots networks (e.g., local businesses, faith networks, libraries, schools) and innovations (e.g., mural art) that city and county agencies could leverage to target individuals more vulnerable to heat impacts, like non-English speakers, ethnic minority households, and renters. Second, several participants mentioned the need for education on existing resources, programs, and assistance, as well as the benefits of action. Recommendations included partnering with utility and water companies to learn about the programs and incentives assisting households and businesses in reducing energy consumption and waste heat, moving to alternative energy sources, or increasing shading and cooling of properties. Mandatory employee training on the risks of heat exposure and protection was emphasized by participants in the *workforce and heat protection* theme. Participants also called for a consolidation of existing programs to help community members understand and navigate resource options. From the perspective of government agencies, a need for coordinated and up-to-date information was cited as an issue. Public health- and emergency management participants called for improved data availability to better guide resource allocation (e.g., heat relief center location) and education on risks. Third, power outages during heat waves, rising energy bills, energy grid resilience, and power backup were discussed by community representatives, electricity providers, and emergency managers within different themes. Participants debated the need for and feasibility of conducting energy audits across the region and locating homes that are more impacted by power outages. Participants further appealed for decentralized energy resources (e.g., access to rental generators) for backup during power outages. Fourth, participants recognized the need to develop protocols to implement improved cooling centers that accommodate people with different needs (e.g., wheelchair accessibility, pet-friendly, and kid-friendly) and provide holistic services ranging from basic needs like drinking water to healthcare and social services. Transportation to cooling centers was also seen as an area of improvement, especially in rural communities.

Heat mitigation needs were reflected in three recommendations- creating and improving green and blue infrastructure, reducing waste heat, and developing guidelines for ensuring an equitable approach to building energy and climate justice. First, participants encouraged augmenting existing green infrastructure and forestry programs to increase access to free native tree programs, regulate tree-cutting or thinning, and strategically select the variety and type of trees planted. New regulations for grass areas and new building codes requiring sustainable features, water harvesting, and energy efficiency were supported. Participants



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recognized the vast range of co-benefits associated with creating green spaces such as enhancing food security, offering natural shade, and evapotranspiration. Second, *Built* and *Energy* themes deliberated on the different scales of energy use (e.g., homes, businesses, transportation, and public buildings) and examined the opportunities to regulate and incentivize energy efficiency at every level. In this regard, transitioning to alternative energy resources (e.g., community solar grids or publicly funded solar), decentralization of energy, and energy innovations (e.g., rainwater harvesting) were stressed as ways to reduce waste heat and greenhouse gas emissions. Navigating innovation on alternative energy, and also offering affordable and accessible energy options were cited as both a priority and a challenge. Enhancing transit options and cool surface alternatives for roads were also argued to benefit heat risk reduction goals. Third, underpinning all mitigation and management recommendations, participants advocated for principles and guidelines that would help government agencies adopt a more systematically equitable approach toward heat resilience. This included, for example, consolidating financing opportunities offered by utility companies and directing them to low-income and vulnerable households. Similarly, participants specifically focused on making water harvesting and green stormwater infrastructure programs more accessible to all income groups, and adopting a lens of equity when funding green stormwater projects across the region.

Heat governance aligned with two key opportunities- establishing an advisory committee for Southern Arizona and enhancing collaboration across agencies and programs to foster heat resilience. The overarching goal for heat governance was not only to better communicate, identify needs, and allocate resources but also to establish trust with communities. Participants across themes overwhelmingly recognized the benefits of hosting summits such as the Southern Arizona Heat Planning Summit to converge expertise and experiences from a wide variety of agencies, individuals, and businesses and stressed the importance of continued collaborations and partnerships or projects and programs. Coordination with media outlets was also recommended to improve heat risk communication and messaging during the planning stages. Vertical collaboration with organizations like the Federal Emergency Management Association (FEMA) was also encouraged. To collate and voice concerns and needs to the wider network of agencies and groups working on heat resilience in Arizona, participants called for a Southern Arizona-specific advisory committee. The central group, under the leadership of local public health and social service professionals,



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would convene a working group of a wide range of partners to prepare communities for extreme heat.

## 3. Southern Arizona Heat Planning Summit Outcomes

The Southern Arizona Heat Planning Summit has served as a catalyst for cross-sectoral heat risk reduction planning across the Southern Arizona region. Within three weeks, recommendations from the summit were compiled and incorporated into Arizona's Extreme Heat Preparedness Plan (2024). The 2024 state plan includes goals that align with recommendations identified through the summit, such as enhancing collaboration across agencies for heat emergencies, improving cooling center operations and networks, and refining education and information on heat risks and vulnerabilities.

Four months after the summit, the City of Tucson adopted the state's first Heat Action Roadmap plan (2024) and a Heat Protection Ordinance for City Contractors. The summit was a key stepping stone in preparing the Heat Action Roadmap (2024, p. 16) and directly informed its three goals (2024, p. 7). Goal 1: *"Inform, Prepare and Protect People"* aligned with calls for better education and warning systems and heat advisory committee; Goal 2: *"Cool People's Homes, and Community Centers"* reflected calls for efficient and accessible cooling centers and energy efficiency and weatherization support for homes; Goal 3: "*Cool Tucson neighborhoods*" advanced several heat mitigation strategies supported by participants at the summit such as green infrastructure and transit improvements. Furthermore, the plan adopted an equity lens with actions directing resources to particularly heat-vulnerable groups like people facing housing insecurity, people working outdoors or in high temperatures, and low-income residents.

The Pima County Health Department (PCHD) mobilized its Emergency Mitigation and Preparedness (EMAP) Division and the Office of Climate and Environmental Health Justice (OCEHJ) to lead a multisector heat relief response following the Southern Arizona Heat Summit. OCEHJ now coordinates regional heat relief efforts, enhances public awareness of heat risks, and prioritizes data-driven initiatives for community heat resilience.

The PCHD Informatics Team maintains an Esri ArcGIS map with cooling center details for 40 sites in Pima County and five sites in Cochise County, and distributes a printed foldable version across the network, to city buses, libraries, and centers serving the unhoused.



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The PCHD Communications Team has produced a Beat the Heat Campaign with nearly 50 bilingual media assets (flyers, social media posts, and advertisements), shared via multimedia channels and available for partner use, and distributed over 6,000 bilingual postcards on heat illness signs and first aid.

EMAP hosts weekly Heat Briefings featuring weather forecasts, epidemiological surveillance reports on heat-related illnesses and mortalities, cooling center usage, and updates from various partners, including Tucson Electric Power and local first responders. The Joint Heat Action Team (JHAT) was also established to focus on operational heat policy, planning, and training needs.

The Pima County Health Department has supported the Arizona Department of Health Services in placing five "COOLtainers" across Pima County (two within the City of Tucson, one in the town of Ajo, and two with Tohono O'odham Nation). "COOLtainers" are fully ADA-accessible, air-conditioned repurposed shipping containers that operate off solar power.

OCEHJ produced the Pima County Health Department 3-Year Heat Plan and is finalizing a Heat Emergency Response Plan. Pima County adopted an Administrative Procedure (3-35) for Heat Workforce Safety and is working with labor and community partners to finalize a Heat Workforce Safety Ordinance aligned with the tenets of the federal Occupational Safety and Health Administration (OSHA) Proposed Rule.

The State of Arizona is planning to host a statewide heat summit in the fall of 2024 to inform its planning efforts for the summer of 2025, and local partners are now planning another Southern Arizona Heat Summit to ensure regional considerations are included again in the state efforts. The first summit resulted in several adopted plans and policies, new cross-jurisdictional working groups, and information-sharing strategies and can serve as an example for other academic and local partners seeking to begin or advance their efforts to address extreme heat.

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