Overview

The Health Impact Project with the city of Tempe is an effort to address the threat of extreme heat through informed design and decision-making. Assessments will allow the city to understand how parks, playgrounds, multi-use paths, arterial walls, and parking lots currently perform on extreme heat days. In 2019, the city of Tempe, Arizona initiated its Health Impact Project as a pilot for reducing extreme heat along four types of infrastructure: public parks, multi-use paths, walls, and parking lots. A cross-sectional team of researchers, residents, and city officials collaborated to conduct a variety of capacity building activities including:

- Citywide heat and health survey to understand social differences between Tempe character areas;
- Microclimate assessments to measure surface, air, and mean radiant temperature across various sun exposures, materials, and times of day for the four infrastructure types;
- Participatory heat assessment conducted by residents and researchers to measure temperatures across various infrastructure and learn how perceptions and preferences intersect with those measured;
- A citywide action design workshop, where researchers and city officials explored findings to begin co-creating design and policy guidelines.

1. Parks & Playspaces

Questions:
- What are the hottest materials in the playground?
- What are the mean radiant temperatures at ground level under various conditions on multi-use paths?
- What is the thermal distribution of different arterial wall designs by orientation?

Findings:
- Tension between accessibility and surface temperature hazards with rubberized surfaces (can reach +170°F)
- Shaded, thermal capacity, and orientation impact on surface temperatures
- Thermal performance varied depending on hour of day
- Structural concrete columns and ground beams showed highest night time temperatures
- The effect of wall surface roughness, as in smooth versus rough masonry, was not thermally visible
- Overall Lessons Learned & Next Steps:
- Create shared understanding of metrics and terminology
- Address and leverage better cooperation between past, present, and future research-policy activities
- We don’t understand enough about residents’ thermal experience, and also need translate our thermal information
- City staff’s perceived role in how heat is in their area of concern and action
- Need to build in time at end of project to reflect on past efforts, how to coordinate with new efforts, and passing the research forward

2. Multi-Use Paths

Questions:
- What are the mean radiant temperatures at ground level under various conditions on multi-use paths?

Findings:
- Mean radiant temperatures collected using MaRTy (see figure 2a) at Kiwanis North Play
- Findings:
- During mid-day, southern segment of College Ave was perceived as the hottest where it had the lowest amount of shade

3. Arterial Walls

Questions:
- What is the thermal contribution of different arterial wall designs by orientation?

Findings:
- Structural concrete columns and ground beams showed highest night time temperatures
- The effect of wall surface roughness, as in smooth versus rough masonry, was not thermally visible

4. Parking Lots

Questions:
- What is the impact of PV shade in parking lots during different times of day?

Findings:
- Findings:

Overall Goals

- Clarify the health threats of extreme heat with Tempe staff and residents
- Identify infrastructure that enhances or reduces extreme heat
- Develop design guidelines for capital improvement investments
- Develop policy guidance
- Provide the Mayor and Council with clear next steps

Key Questions

- In what ways is heat connected to City staff’s responsibilities with the City and with their department?
- How would City staff use this microclimate and social information in their different City roles to improve decision-making or to create policy?
- How could this information be improved and made more usable for the City and for residents to build climate literacy and action around extreme heat?

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5. Community Activities

1. Conversations with City Staff:

From June through November 2019, the team had several meetings with City staff to discuss potential cooling strategies for each infrastructure type. City staff also discussed the potential use of the data that is being collected and the decision-making process. This was not a success as the data was not available for the study period.

2. Heat Walk in Kiwanis Park:


Participants: 60 participants, 36 community members, 20 researchers, City staff, volunteers. 2 mile route through neighborhoods near Kiwanis Park. Walkers began at 6:15 am. Participants were interviewed along the route and completed short survey at eight predefined stops. Most participants were between 25-44 years of age, 50% female, 28% male, 4% female, 27% other.

Participants liked that they were very concerned or extremely concerned about heat risk from extreme heat in people in Tempe.