

Heat Action Planning Guide

MESA CARE NEIGHBORHOOD

Creating Urban Heat Solutions in the Valley of the Sun



This guide was created for the Nature's Cooling Systems Project, a partnership of The Nature Conservancy, Arizona State University's Urban Climate Research Center and Urban Resilience to Extremes Sustainability Research Network, Maricopa County Department of Public Health, Central Arizona Conservation Alliance, Phoenix Revitalization Corporation, RAILMesa, Puente Movement, and Center for Whole Communities.



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Heat Action Plan for Mesa Care Neighborhood Water Tower Improvement District



Executive Summary

Nature's Cooling Systems Project for Heat Action Planning in the Mesa Care Neighborhood / Water Tower Improvement District

In Greater Phoenix, urban heat is impacting health, safety, and the economy and these impacts are expected to worsen over time. The number of days above 110°F are projected to more than double by 2060. In May 2017, The Nature Conservancy, Maricopa County Department of Public Health, Central Arizona Conservation Alliance, Urban Resilience to Extremes Sustainability Research Network, Arizona State University's Urban Climate Research Center, and Center for Whole Communities launched a participatory Heat Action Planning effort to identify both strategies to reduce heat and improve the ability of residents to deal with heat. Community-based organization RAILMesa joined the project after the Mesa Care Neighborhood was selected as one of three neighborhoods for the project. Catholic Charities Care Campus soon became another key collaborator. Beyond building a community Heat Action Plan and completing demonstration projects, this project was designed to develop awareness

of urban heat and to build better relationships between neighbors, organizations, community leaders, and decision-makers to do something about the issue of increasing heat. Storytelling wisdom and scientific evidence were used to understand the challenges that residents face during the hot summer months.

As a result of three workshops within each community, residents shared ideas that they would like to see implemented to increase their thermal comfort and safety during extreme heat days. As depicted on page 37, residents' ideas intersected around similar concepts, but specific solutions varied across neighborhoods. For example, all neighborhoods would like to add shade to their pedestrian corridors but how and where to put these shade improvements into place differed. Some neighborhoods prioritized routes to transit, others prioritized routes used by children on their way to school, and others wanted to see shaded rest stops in key places. Four overarching themes emerged across all three

neighborhoods—**advocate and educate; improve comfort/ability to cope; improve safety; build capacity.**

Extreme heat causes residents to experience serious safety challenges in their day-to-day lives. Communities, businesses, and decision-makers can, and should, work to address those challenges.

Primary concerns voiced by residents in the Mesa Care Neighborhood during workshops include:

1. The need for shade, especially along routes to school or during long wait times at traffic lights
2. Access to drinking water
3. Connectivity from community to broader transportation routes
4. Safety for children and elderly, especially those living alone
5. Need for advocacy for urban heat solutions

Residents want advocacy training on how to educate decision-makers on the effects of extreme heat in their community. They want to know how to speak up about heat as a health and safety crisis and share the potential for improvements to thermal comfort and public health. Community members proposed pedestrian-oriented design changes to transit, such as shorter wait intervals at traffic lights or diagonal crosswalks. Another suggestion to increase thermal comfort at corners is to install shade. Residents would like to see vertical shade and shading that can move with

the sun or vine covered walkways like those at the Desert Botanical Garden or on Southern Avenue in South Phoenix. Residents also proposed an Emergency Summer Plan for students in K-12 and adults in the community.

Heat Action Plans may be used by any resident or community leader to advocate for the integration of urban heat solutions in plans or projects in their neighborhood.

Comments on Heat Action Planning

"I am here [at the Heat Action Planning workshop] because I want to try to help so everything changes."

- Mesa Resident

"With conversations with neighbors in South Phoenix, what is very interesting to me is that they say, 'Oh it's hot, that's normal.' And I think that's the interesting part of the conversation. It is hot, but it's not normal. There is something that we can do."

- Community Organizing Partner

"What makes this project unique is that we're focused on improving quality of life, we're not just recording facts about heat and shade, etc., you need people's experiences to drive the process of change"

- Core Team Partner

Strategic Themes

Advocate and Educate

**Improve
Comfort/Ability
to Cope**

Improve Safety

Build Capacity

Mesa Care

Using social media and hashtags to highlight child safety and bus route issues



Lindo-Roesley

Planting vegetation for empty lots to reduce dust



Edison-Eastlake

Create signage for heat safety and wayfinding could reduce risk





Who We Are

Southeast of downtown Mesa, bordered by East Main Street and East 8th Avenue on the north and south and South Mesa Drive and South Stapley Drive on the west and east, the Mesa Care Neighborhood is known as the “Water Tower Improvement District.” Redevelopment of a former junior high school into a community center and the surrounding grounds into Eagle Park will be a centerpiece of this neighborhood and is presently underway. That redevelopment is part of a redesign of the Broadway Corridor.

The Catholic Charities Care Campus is located in the center of the Mesa Care Neighborhood. The poem on the right was developed by kids in the Care after-school program.

Moving-Walking People

*Our neighborhood is sweet tasty smells like pan
from the panadería or Patty's house*

*The scent of charcoal and carne asada that means
it's the weekend*

*Family: mom and dad, abuela, tíos y tías,
brothers, sisters, cousins, and friends who are family
Fill the yard with love
And kindness and yelling and music*

*Out in the sun
On our scooters, bikes
Or with the soccer ball
In empty lots and on big sidewalks*

*Jumping over fences
when the food is ready
churros, tamales, or spaghetti,
maruchanes, orange chicken, or frijoles charro*

*Our streets are busy with people moving-walking, on bikes
full of pickup trucks and parked cars
and the sound of tires and horns.*

Our neighborhood means family and home.

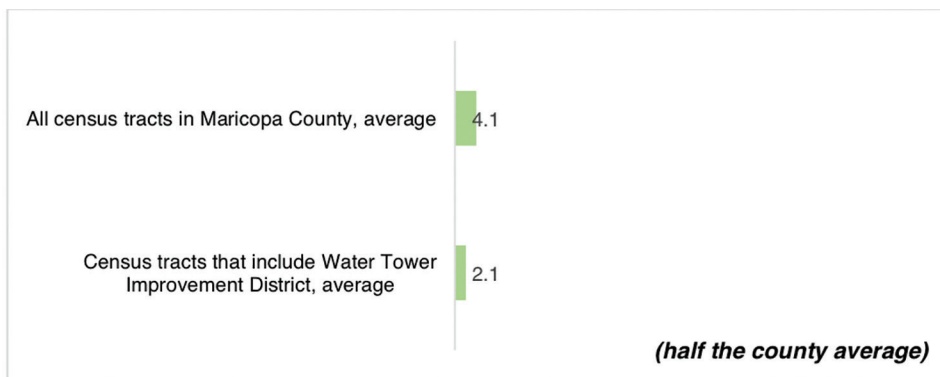
Neighborhood Baselines

Mesa Care Neighborhood

The following data provide a baseline for reference for the Mesa Care Neighborhood/Water Tower Improvement District. Tracking these indicators over time will help neighborhoods and those involved in planning decisions understand whether their heat mitigation and adaptation initiatives are helping to improve (or hurt) the current situation.

Health

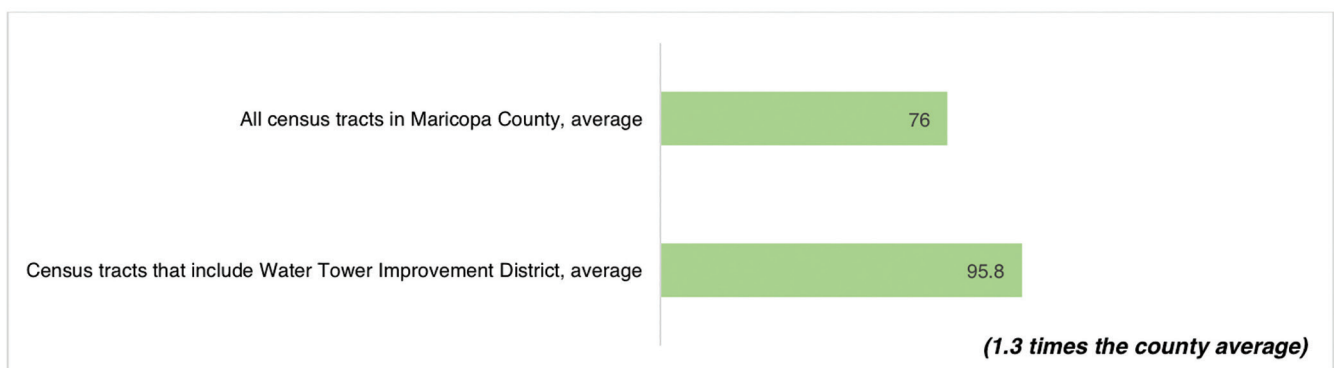
Average annual heat-associated death rate per 1,000,000 population, 2012-2017



62% of Maricopa County census tracts had lower heat-associated death rates than the Water Tower Improvement District, 2012-17

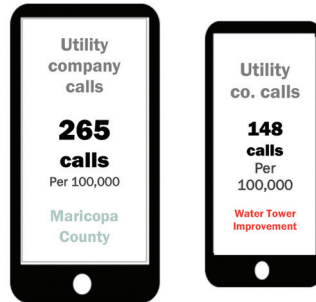
* Reasons for exceedingly high rates of heat deaths are not currently known.

Average annual heat-related illness rate per 1,000,000 population, 2012-2017



72.2% of Maricopa County census tracts had lower heat-related illness rates than the Water Tower Improvement District, 2012-17.

Utility Issues



Environmental characteristics

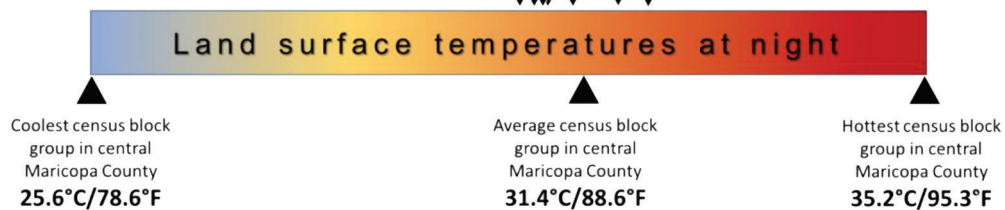
Land surface temperature on 8/6/2014 at night

88.3 °F

31.3 °C

Regional land surface temperature comparison

Water Tower Improvement census block groups
average = 31.3°C/88.3°F

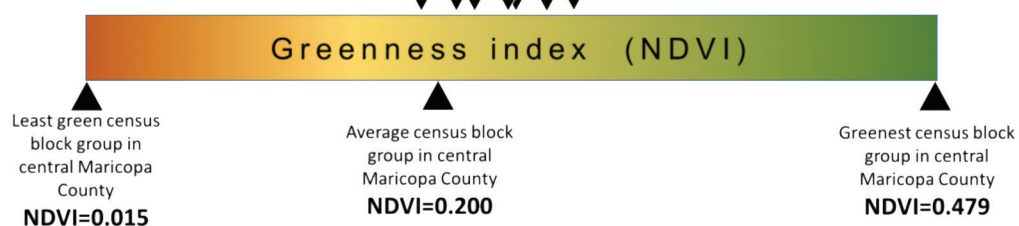


Tree coverage 10.5% ▪ County average 8.8%

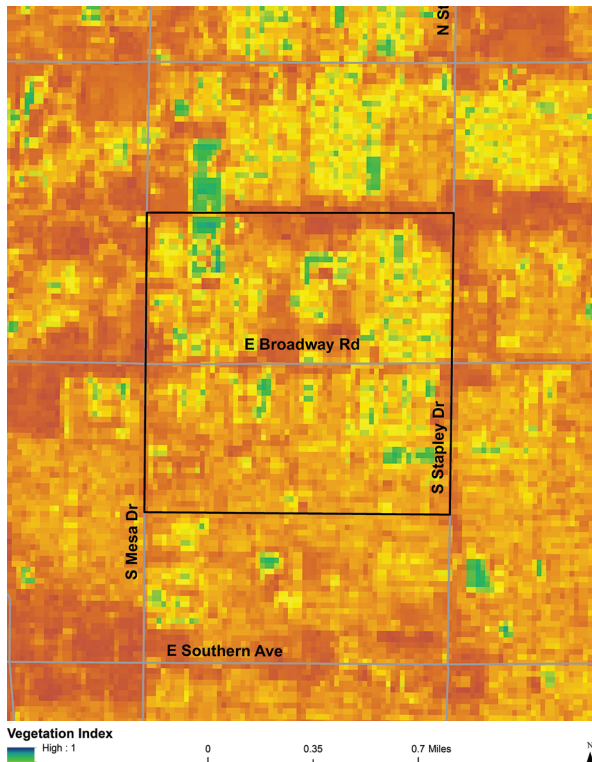
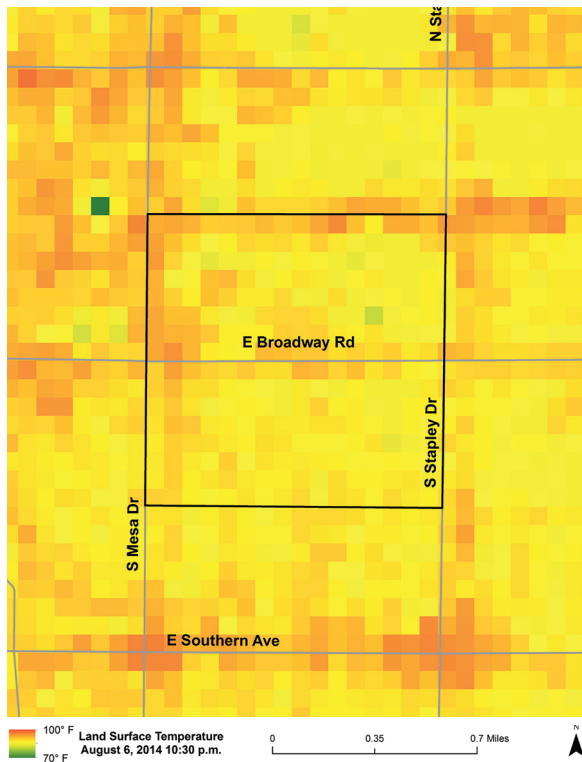


Census Block Groups

Water Tower Improvement census block groups
Average NDVI = 0.238



Land Surface Temperature (top)
and NDVI (bottom) within Mesa
Care Neighborhood / Water Tower
Improvement District.



Summary of Environmental Characteristics: Water Tower Improvement

Surface temperatures: Most of the neighborhood has surface temperatures that are near or even below the regional average. However, the northwest part of the neighborhood, west of Hobson and above Broadway, is notably warm.

Vegetation coverage: Southwestern parts of the neighborhood, west of Horne and below Broadway, fall below the regional average in terms of tree and grass coverage.

Greenness: The neighborhood is relatively green compared to many others in central Maricopa County, but still falls well below the region's greenest neighborhoods.

Methods

Baseline data were sourced from the following databases:

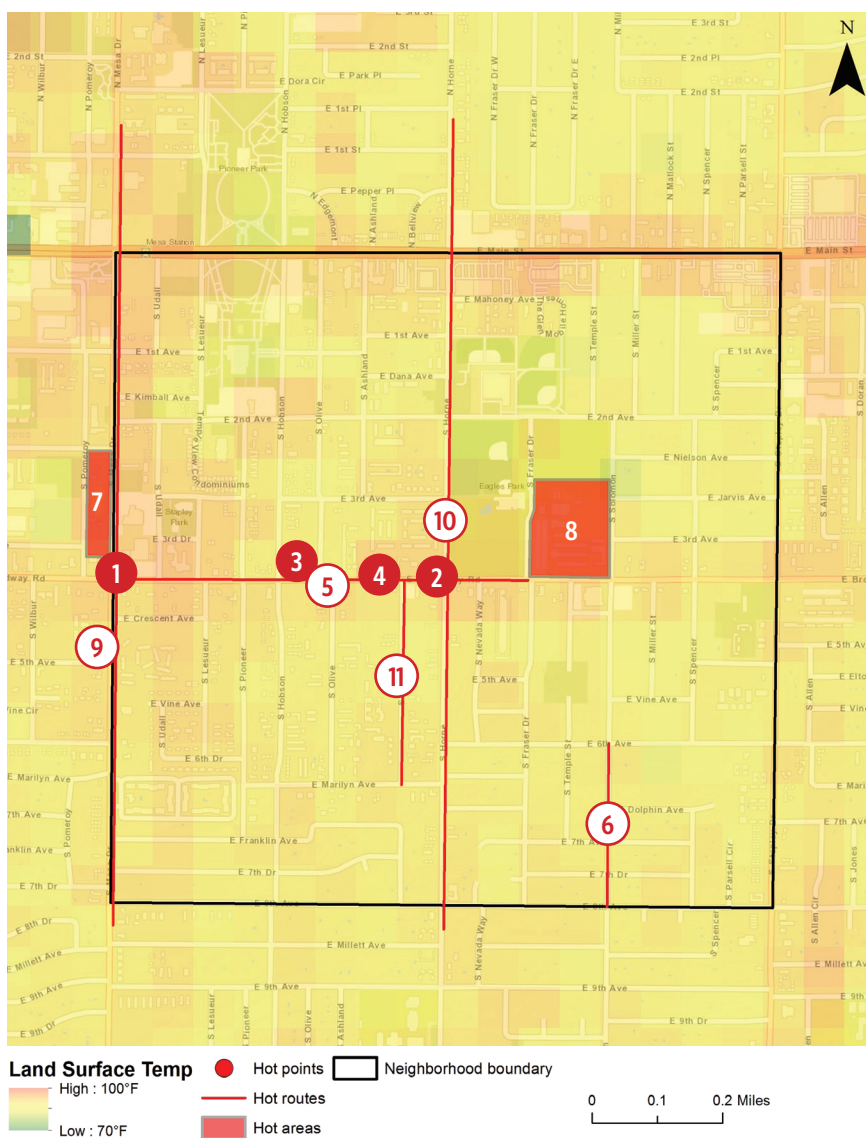
Maricopa County Department of Public Health (MCDPH) heat mortality surveillance, MCDPH heat morbidity surveillance, Arizona 2-1-1, NASA ASTER satellite imagery, NASA LANDSAT satellite imagery, the National Agriculture Imagery Program (NAIP), and the US Census Bureau. Some of the variables were measured at the census tract level, some were measured at the census block group level, and some were measured at the zip code level. Census tracts are regions that include 2,500 to 8,000 people. Census tracts are divided into multiple census block groups. Tracts and block groups were selected based on neighborhood boundary lines. Individuals were counted in these rate calculations if they had an address that could be geocoded to a Maricopa County census tract. Neighborhood-specific rates were calculated by average rates of census tracts included within the neighborhood's boundaries. To request additional public health data, contact the Maricopa County Department of Public Health, Office of Epidemiology at <https://www.maricopa.gov/3511/Request-Data>. Environmental data sets were provided by Arizona State University and can be made available through ASU's Urban Climate Research Center at <https://sustainability.asu.edu/urban-climate/>.

Mesa Care Hot Spot Intervention Points

Hot spot maps were developed through a process of identifying areas where community members have experienced difficulty with the heat while moving through their neighborhood. The core team recommends that they be used to define points of intervention for improving thermal comfort.

ID NOTES

- 1 Bus Stop - Hot area
- 2 Bus Stop - High use bus stop
- 3 Mil Amores Tires - old tire place
- 4 Mesa Deli - Hot problem area
- 5 Broadway Problem Area - Hot problem area. Broadway and S Mesa Dr to Broadway and S Fraser Dr. Kids walking across street and more bikes on Broadway compared to Main
- 6 S. Solomon 8th-6th Ave - Hot problem area.
- 7 Day Laborers - Hot area. No shade. Laborers are here 6am-4pm
- 8 Lowell Elementary: open during summer months.
- 9 Mesa Dr. - Need shade and bump outs down the whole street
- 10 S. Horne - Entire route needs shade and bump outs
- 11 Bellview to Main - After School Program walking route that could use more shade



"We didn't know how to deal with AC. We had a conversation about some housing, they are not very friendly to the heat, right? Cheap apartments, cheap houses, cheap walls, and that makes everything worse."

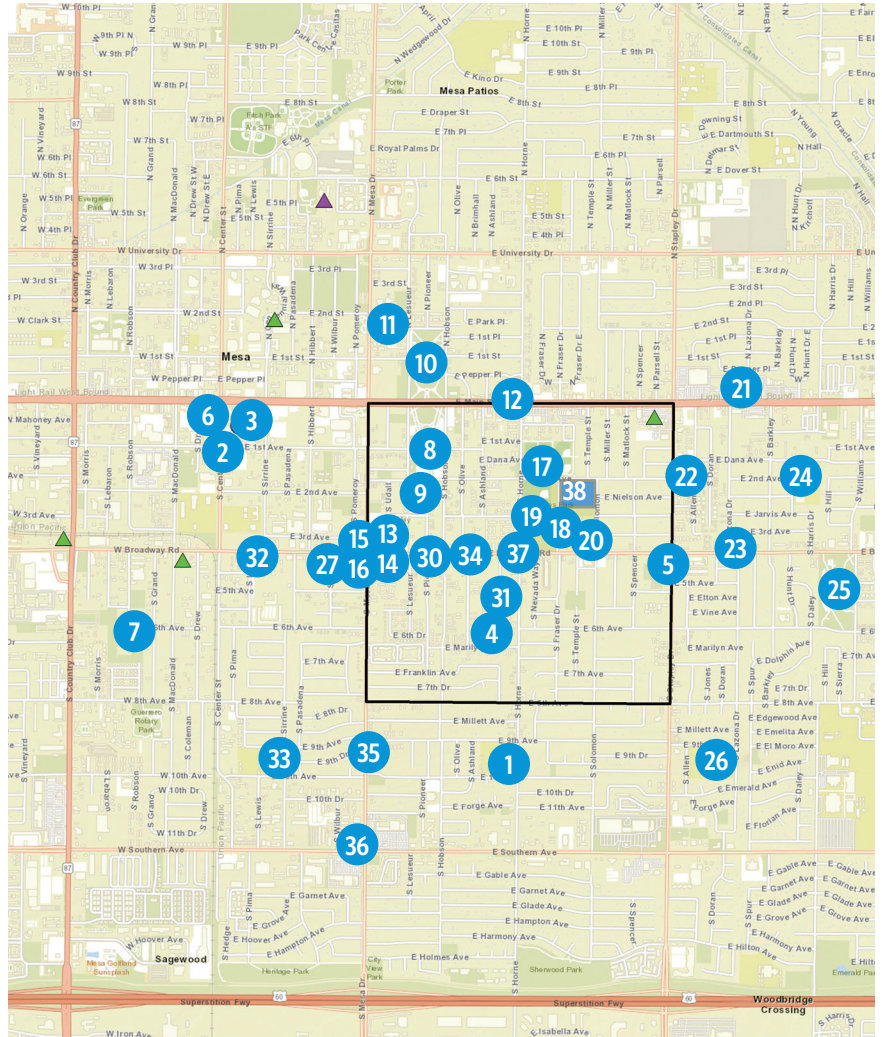
- Resident, Mesa Care Neighborhood

Mesa Care Cool Spots

Cool spots represent cooling assets that residents identified during workshops or existing emergency heat relief stations, hydration stations, or cooling centers / refuge locations.

ID NOTES

- 1 Holmes Elementary School and Headstart - Cool
- 2 First United Methodist Church of Mesa - Cool resource. Coolers, place to get water, food and clothing.
- 3 Mesa Arts Center - Cool resource. Cooling center, blackouts/extreme heat events
- 4 Community Bridges Health Services (rehabilitation) Shelter
- 5 QuikTrip - Restroom and water
- 6 Heritage Academy Charter School - 7-12
- 7 Boys & Girls Clubs of the East Valley
- 8 Mesa Arizona Temple - Grass, contemplative space, visitor center. Cool resource.
- 9 Church of Jesus Christ of LDS - Cool resource
- 10 Pioneer Park - New splash pad and covered play area. Cool resource.
- 11 First Presbyterian Church - Cool resource
- 12 Paletas Ice Cream - Cool resource
- 13 Kerby's Furniture - Cool resource.
- 14 El Bijo Taco - Cool resource. Tent.
- 15 Circle K - Gives out water
- 16 Deliciosos Super Hot Dogs - Tent. Cool Resource.
- 17 Mesa InterStake Center - Cool resource.
- 18 Lowell Elementary School - Cool resource.
- 19 Future Park - Park planned in 2019. Currently bulldozing.
- 20 Head Start - Cool resource
- 21 Food City - Cool resource.
- 22 Clinica Adalante - Cool resource.
- 23 Taco Stand - Cool resource. Tables in parking lot.
- 24 Christ the King Mission of Mercy - Cool resource.
- 25 Reed Skate Park - Cool resource. Skate park and soccer practice.
- 26 Lindbergh Elementary School - Cool resource. Head start program.
- 27 Los Tres Amigos - Cool resource. Benches with shade.



- 28 Maricopa County WIC - Cool resource
- 29 Mesa Community Action Network - Cool resource. WIC, immunizations, business development
- 30 Mesa Church - Cool resource. Used to be irrigated. Access to irrigation.
- 31 Mesa Care Partnership - Cool resource. Kids/ after school care. Water available. Community garden open. Mom Mobile (mobile maternity unit).
- 32 Broadway Recreation Center - Cool resource. Boxing gym.

- 33 Lincoln Elementary School - Cool resource. Head start program.
- 34 A New Leaf
- 35 Bus Stop - M-F Bus limited service
- 36 Clinic - Cool Resource. Clinic - Mesa and Southern
- 37 Moreno's Mexican Grill - Cool resource. Neighborhood staple
- 38 Soccer Fields - Cool resource

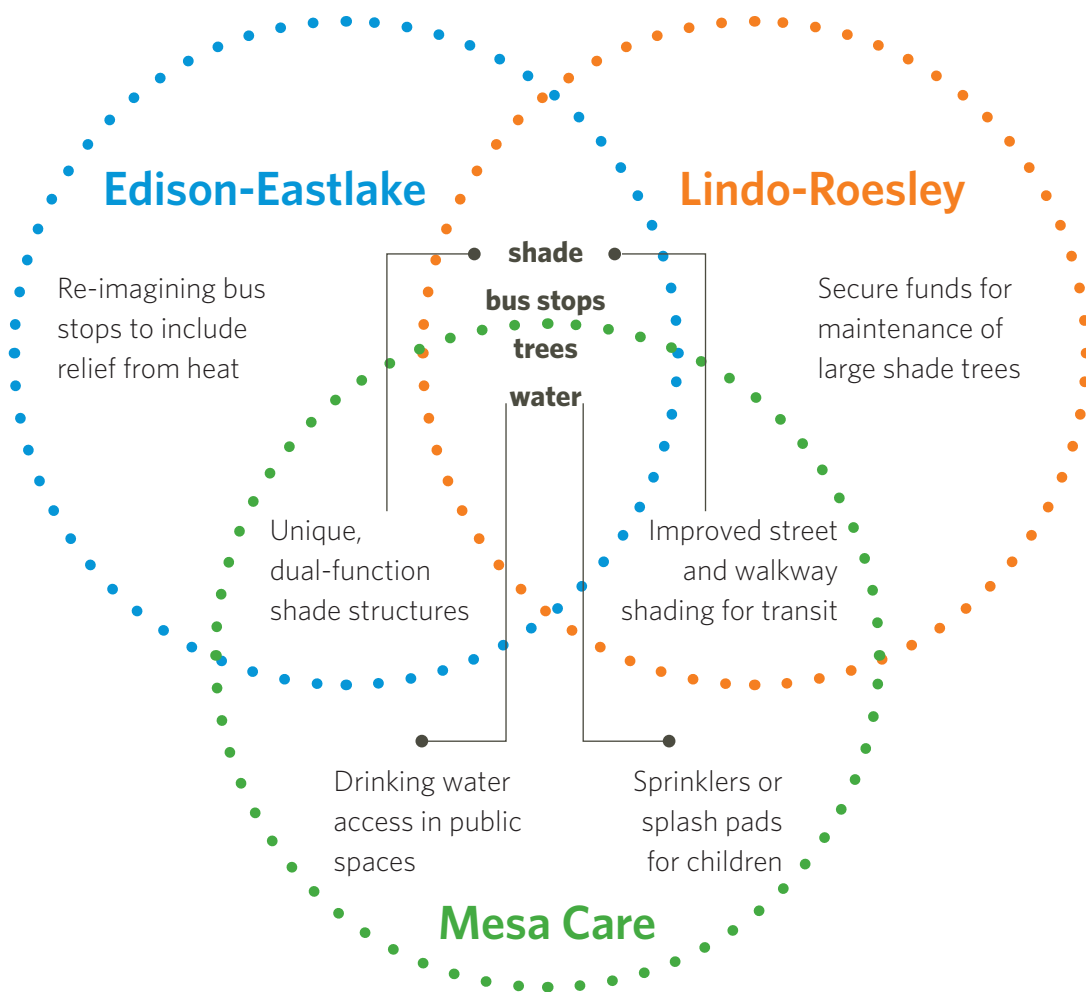


Resident Visions for a Cooler Neighborhood

As a result of three workshops within each community, the residents brought forth ideas that they would like to see implemented to increase their thermal comfort and safety during extreme heat days. The ideas were similar across different neighborhoods, but specific applications of solutions varied across neighborhoods. For example, all neighborhoods would like to add shade to their walksheds but preferences for shade implementation differed, as some neighborhoods prioritized routes to public transportation, others prioritized routes used by children on their way to

school, and others wanted to see shaded rest stops in key places.

Timing is an issue for the city decision-makers and residents alike. Residents would like to see improvements within a very short time, as in the next year. Yet, the planning and funding cycle for capital improvement projects can be five to ten years in the future. The adaptation and mitigation strategies developed from these workshops seek to balance a long time horizon with immediate, grave needs.



Mesa Care Neighborhood/Water Tower Improvement District

Primary Concerns:

1. Amount and quality of shade, especially along routes to school or during long wait times at traffic lights
2. Access to drinking water
3. Connectivity from community to broader transportation routes
4. Safety for children and elderly, especially those living alone
5. Need for advocacy for urban heat solutions

Solution Story

Residents in Mesa expressed dissatisfaction with the amount and quality of shade in their community. They are particularly concerned about children walking on Broadway to and from elementary school. Compounding this issue is the car-centric traffic light pattern that has very long wait times for pedestrians at shadeless corners. One way to lessen exposure is to reduce wait times by changing the timing of the traffic light to allow for shorter wait intervals or to allow for traffic to stop in all directions so that pedestrians can cross diagonally as well as directly across the street.

The other way to increase thermal comfort at corners is to install shade. Shade can be in the form of structural shade or trees and most community members felt that structural shade at corners would be more appropriate to ensure visibility and safety both for pedestrians and vehicular drivers. Structural shade that expands beyond overhead coverage can be incorporated into bus stops, which is only useful during the midday heat and sun. Residents would like to see vertical shade and shading that can move with the sun or vine covered walkways similar to those at the Desert Botanical Garden or on Southern Avenue in South Phoenix.

A bus stop can be transformed into more than a place to wait for transit. They can be areas where residents can rest as they walk to their destination or be developed into micro parks. Misters and fans could provide relief from the heat. They can become an information booth for heat safety and a placemaking tool to direct residents to community cool spots and resources. These bus stops/micro parks could reflect the neighborhood character in their designs. The bus stop can have a “panic button” similar to those found on the light rail and college campuses that would directly connect to the emergency services.

Access to water for drinking is a concern in the Mesa Care Neighborhood/Water Tower Improvement District and access pathways leading out of the community (to work, transportation routes, etc.). Drinking fountains at bus stops, rest stops, or in parks are highly requested. Artistic public water fountains, such as that at Mesa Arts Center, were greatly desired as just looking at them made residents feel cooler and reminded many of fountains found in public squares in other parts of the world. Water features, such as pools or splash pads, were mentioned often as these amenities do not exist in this neighborhood but were available in the more affluent neighborhoods nearby. As with access to green spaces, residents would like to see a water feature available within a ten minute walk in their community. Residents who had small children proposed a low-tech sprinkler set up that could be placed in a public park,

pocket park, or community center, and run at regular times during the summer so that the kids (and adults) could gather and cool off. Wherever the city is watering grass and trees, a sprinkler can be used so that the kids can play and keep cool.

This water feature could also benefit vegetation with its runoff. Residents cited the cost of water and expense of tree maintenance; they see opportunities for increasing the vegetation in the community for people who own land but do not have the resources to install shade features such as trees, rest stops, and pocket parks. A community fund could be developed that helps residents with tree maintenance and planting so that mature trees can thrive, and barren land can be transformed into a community oasis. Trees could also be planted in retention areas to take advantage of the stormwater runoff and the community noted that trees planted in those areas grow much faster and appear to be healthier. In the Broadway corridor and roads leading

Mesa Care Neighborhood

“With conversations with neighbors in South Phoenix, what is very interesting to me is that they say, ‘Oh it’s hot, that’s normal’ And I think that’s the interesting part of the conversation. It is hot, but it’s not normal. There is something that we can do”

- Mesa Resident/CBO

“Mesa used to have irrigation ditches along each house, and it was much cooler. My mother was a girl here in Mesa. When they got hot, they’d go sit in the irrigation ditch and that was how they lived through the summer. They had fruit trees, citrus trees, palm trees all over.”

- Mesa Resident

into it, the public right of way also holds potential for cooling features. Access roads could be re-designed to incorporate bump-outs for trees and curb cuts to help capture stormwater. Wide roads could be narrowed, and the space gained is an opportunity area for adding greenery and providing extra safety for pedestrians. Just seeing trees and other vegetation makes residents feel better and cooler.

Residents are concerned about their safety on extreme heat days for both children and adults. The elderly residents who have been in the community for twenty to thirty years, especially those living alone, are of particular concern due to the lack of amenities, their limited income, and decreased mobility. Residents feel that they are a fountain of wisdom in how to cope with the heat and would like to involve these elders to share their coping strategies and to ensure that they are cared for during extremely hot days.

Residents proposed an Emergency Summer Plan for students in K-12 and adults in the community. For adults, they would be made aware of the cool spots and official cooling centers, be able to use an app or live map on the bus stop shelter that would let them know the bus arrival times to avoid needless waiting in the hot sun and have access to water throughout their outdoor activity. For children, a program can be developed with teachers to educate students on heat safety, provide information about cool routes and spaces and the importance of rest while outside in high temperatures, and train them to always carry water. Reusable water bottles can be distributed at school (with safety information on the side) so that teachers do not let any child outside without a full bottle of water. Older students can use this safety information as the basis of an advocacy program to lobby for more cooling features in the community.

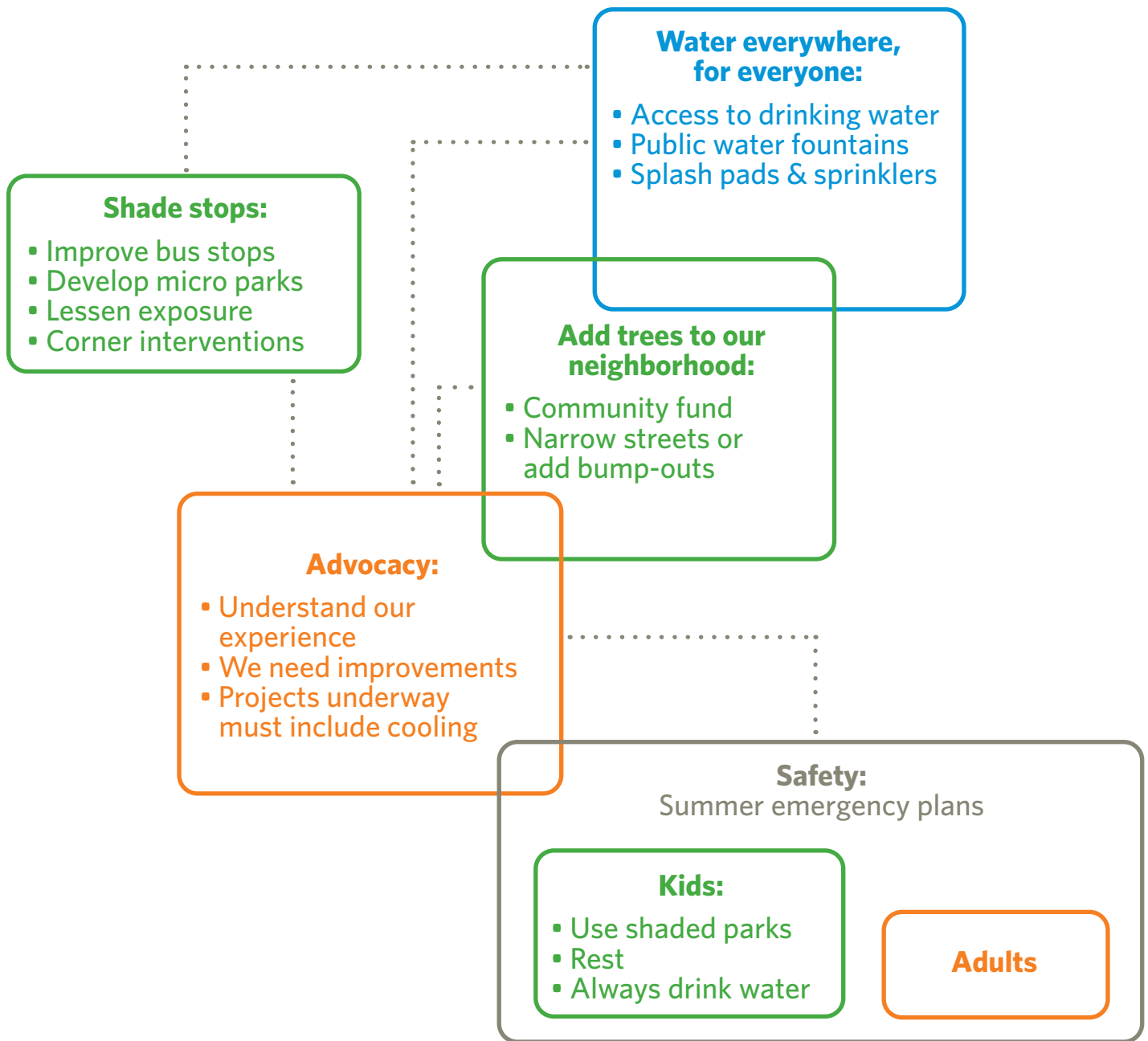
These mitigation and adaptation strategies must be shared with elected officials and city departments in order to be implemented. Residents feel that they need advocacy training, especially since these workshops were, in many cases, their first interactions with governmental officials. Advocacy for this community

entailed educating decision-makers on the effect that extreme heat has on their community, the fact that this is a health and safety crisis, and they need improvements to increase thermal comfort and public health outcomes. The advocacy training could help them to effectively communicate their position and take advantage of projects that are already underway to ensure that they include cooling features desired by this community. Neighborhood Services within the City of Mesa offered to coach residents through the neighborhood registration and capacity building process.



Other ideas for advocacy included launching a Twitter campaign for heat entitled #ArmyofMoms that would highlight how heat affects mothers with small children and operation of the circulator bus, The Buzz, on roads that have no shade during the hot summer months. Residents that use public transportation from this community could be trained so that they could serve on the transit advisory board as there are currently no board members serving who rely solely on public transportation. Both residents and city officials felt that more involvement on both sides was needed as there are misconceptions that 1) city officials assume residents don't want to be involved if they don't show up to planned community outreach events and 2) residents have limited knowledge of the process, timelines, and access points to have their voice heard and acknowledged.

Residents' proposed heat solutions fell primarily into categories of shade, safety, advocacy, and water, with variations on how and where to implement.



Modeled Changes to Urban Heat

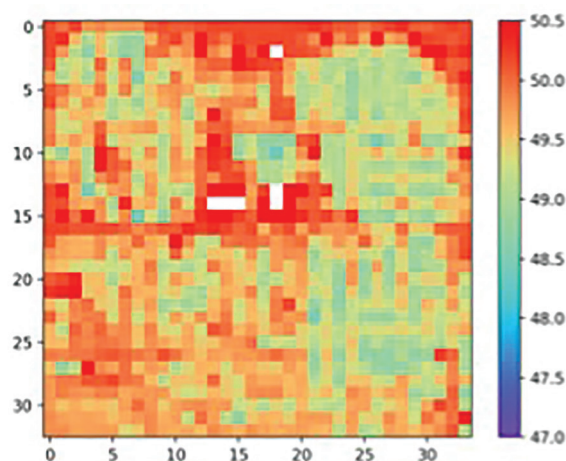
Mesa Care Neighborhood/Water Tower Improvement District

Using data from June 2017 and land cover data (2010 NAIP) to study the potential impact of these heat actions on the neighborhood, the existing land cover was simulated along with representations of proposed changes to the neighborhood. Specifically, the neighborhood was conceptualized with increased tree coverage. In this tree coverage scenario, we increased percentage of tree canopy within the neighborhood to 30%.

These simulations are shown in the associated figures: the baseline, and then the cooling scenario which uses a “relative-to-baseline” legend to highlight the maximum cooling effect.

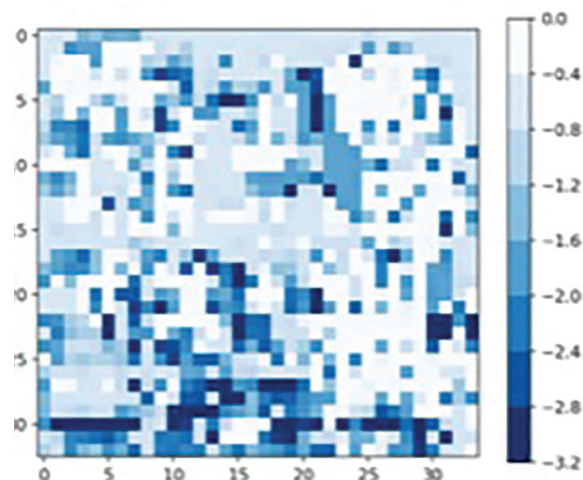
Modestly increasing the tree canopy to 30% results in widespread cooling across the Mesa Care Neighborhood (as much as 6° F). This cooling will certainly be more localized in reality; however, this map shows the potential for significant cooling in the neighborhood. Some areas already show significant cooling in certain pockets of Mesa, specifically in areas that were some of the hottest in the baseline and had the least amount of shade. This cooling could then be prioritized to these warmest locations, as well as near bus stops and along common active transit routes to provide increased shade for individuals spending time outdoors. Note: areas with no change in temperature are areas where the tree canopy in the 30 m by 30 m cell was at or above 30%.

Baseline



Simulated 4pm near surface air temperature (C) of the Mesa Care Neighborhood on June 20, 2017.

Cooling Scenario



Simulated 4pm near surface air temperature (C) of the Mesa Care Neighborhood with added trees on June 20, 2017.

Drawings of a Cooler Neighborhood

Enhancing shaded pathways along the perimeters of parks can help to encourage use and care of park amenities like those at Eagles Park, while improving walkability in the neighborhood.



Incorporating structural shade where trees cannot be planted, such as under power lines, is an alternative for providing heat relief along Broadway Road.



Pathways to schools S. Horne (plan)

Eliminating harsh environmental conditions near schools can create a more inviting atmosphere.
Tree placement should be prioritized along paths to schools.

