

# Advocating for Equitable Heat Solutions in the Phoenix Climate Action Plan



June 22, 2021

Union of  
**Concerned  
Scientists**



C4O  
CITIES



Science for a  
healthy planet  
and safer world.

**Union of  
Concerned Scientists**

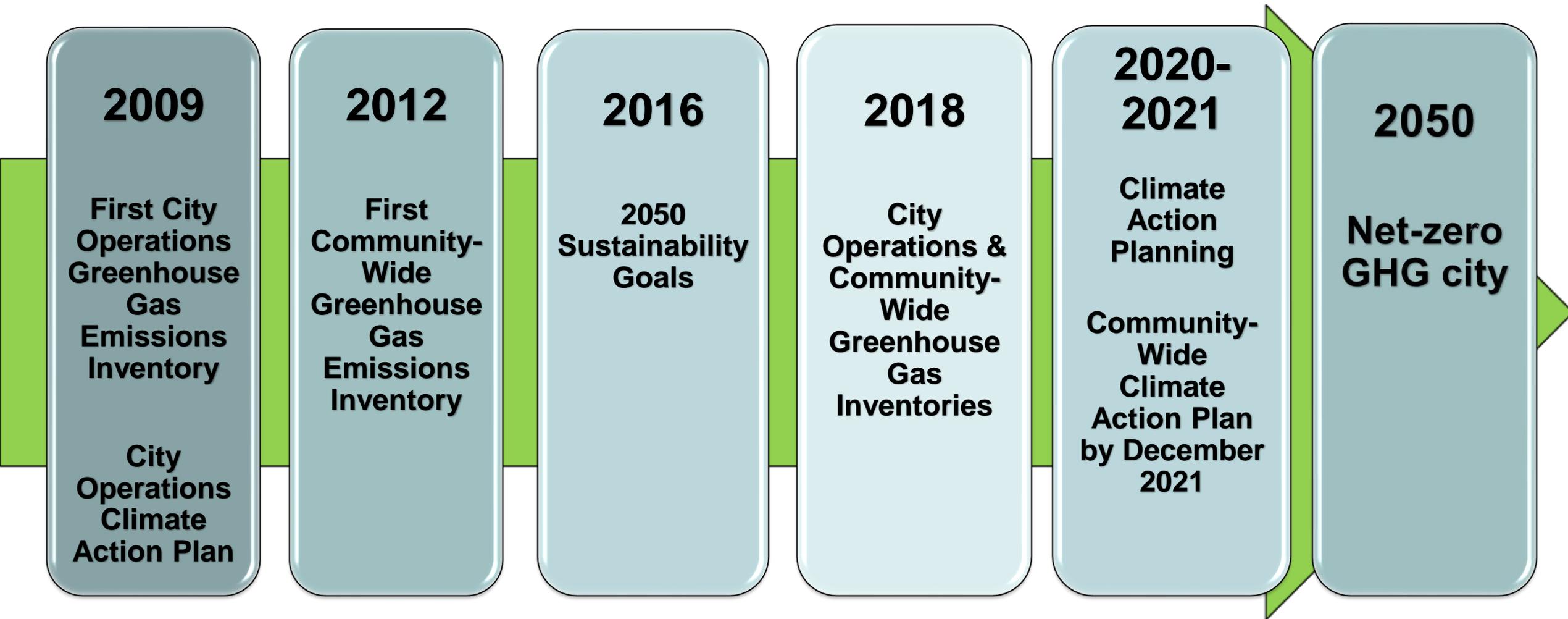
# Introduction - C40 Cities



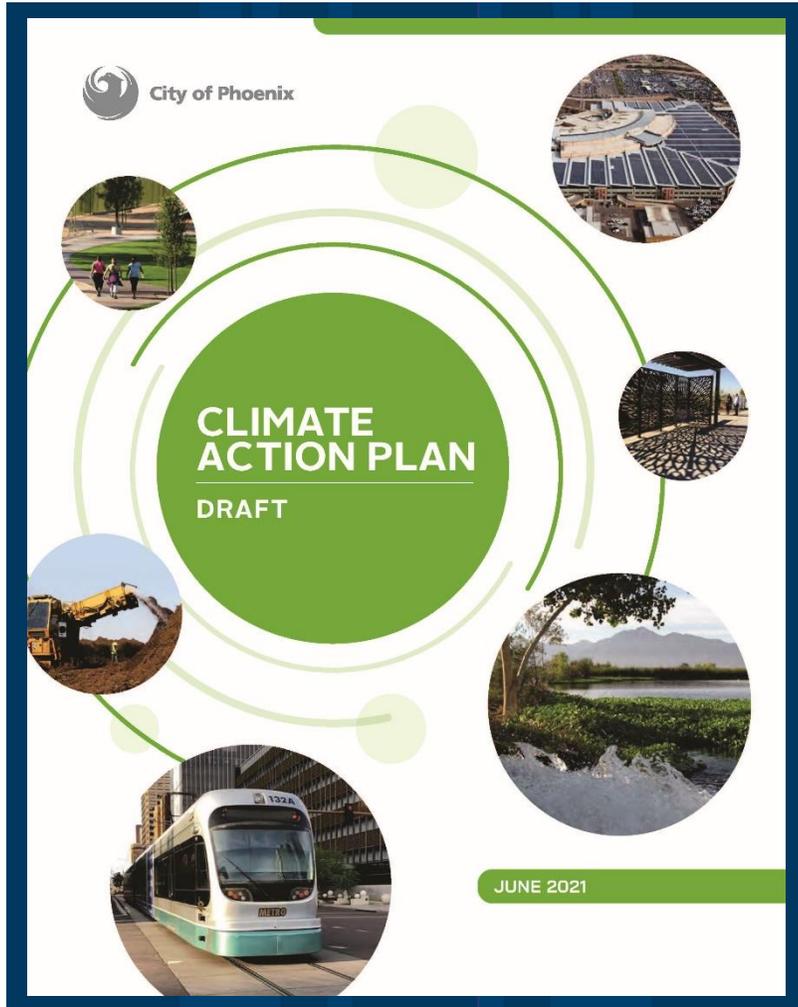
- Mayor Kate Gallego affirmed Phoenix commitment to the Paris Climate Accord – reduce GHG emissions by 2050
- Phoenix joined C40 Cities in Feb. 2020
- C40-compliant Climate Action Plan by Dec 2021
- **Deadline 2020** – 67% Reduction in GHG Emissions by 2030.



# Introduction - Ongoing Efforts



# Climate Action Plan Draft



## GHG Emissions Reduction Goals

**Stationary Energy Sector**  
**Transportation Sector**  
**Waste Sector**

## Resiliency Goals

**Air Quality**  
**Local Food Systems**  
**Heat**  
**Water**

# Climate Action Plan Draft 2050 Goals



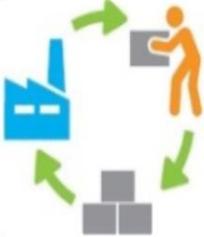
## GHG Emissions Reduction Goals



New buildings are **Net Positive** in energy & materials



**40%** of commutes by walking, biking, transit & car-share



**Zero Waste** through participation in the circular economy

## Resiliency Goals



**Clean Air**  
Out-performing federal standards



A thriving vibrant **Food System**



**25%** Tree and shade canopy



**100-Year** Clean & reliable supply of water

# Heat Goals



## 2050 Goal:



Everyone within a  
**5-Minute  
Walk**  
of a park or pathway



**25%**  
Tree and  
shade canopy

### Goal 1:

Create a **network of cool corridors** in vulnerable communities to facilitate movement from residents' homes to their places of employment, education and play.

### Goal 2:

Increase **shade** provided by trees or constructed shade in parks, streets and right-of-way.

### Goal 3:

Provide **resources and services** to residents to manage heat.

### Goal 4:

Increase the use of high albedo, or **reflective, materials** in infrastructure projects.

### Goal 5:

Develop **HeatReady** certification for cities.

# Next Steps



**Draft Plan Public Comment Period**

**June 2021**

**Public Engagement**  
Virtual Workshops & Survey

**June 2021**

**Final Plan to City Council**

**Fall 2021**

# Share your Opinions and Ideas

## Climate Page, Survey, Future Workshop Information

[www.phoenix.gov/climate](http://www.phoenix.gov/climate)

Submit questions to  
[climate@phoenix.gov](mailto:climate@phoenix.gov)



[@phxenvironment](https://twitter.com/phxenvironment)

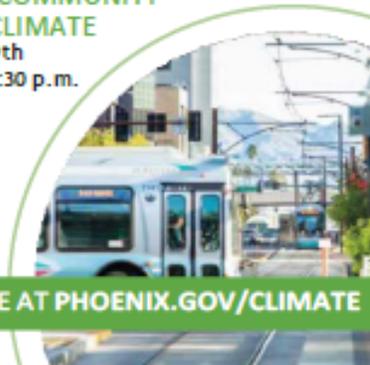


## THE FUTURE OF PHOENIX DRAFT CLIMATE ACTION PLAN

Join the City of Phoenix and provide your input on addressing climate change. Share your concerns, needs, and ideas to co-create solutions. Your collaboration is needed to help the City determine priorities, needs, and opportunities to address climate change.

### VIRTUAL WORKSHOP SERIES:

- |  |  |
|--|--|
| <b>BUSINESS AND CLIMATE</b><br>June 16th<br>11:30 - 1:00PM | <b>COUNCIL D7 AND D8</b><br>June 26th<br>10:00 - 11:30AM           |
| <b>WATER AND CLIMATE</b><br>June 17th<br>5:00 - 6:30PM     | <b>YOUTH CLIMATE</b><br>June 26th<br>3:00 - 4:30PM                 |
| <b>HEAT AND CLIMATE</b><br>June 22nd<br>11:00 - 12:30PM    | <b>YOUR COMMUNITY AND CLIMATE</b><br>June 29th<br>5:00 - 6:30 p.m. |



Help plan the Future of Phoenix

REGISTER ONLINE AT [PHOENIX.GOV/CLIMATE](http://PHOENIX.GOV/CLIMATE)



## SPEAKERS:



**Dr. Juan Declet-Barreto, PhD**, Senior Social Scientist for Climate Vulnerability, Union of Concerned Scientists



**Dr. Vjollca Berisha, MD**, Senior Epidemiologist, Climate and Health Program, Maricopa County Department of Public Health



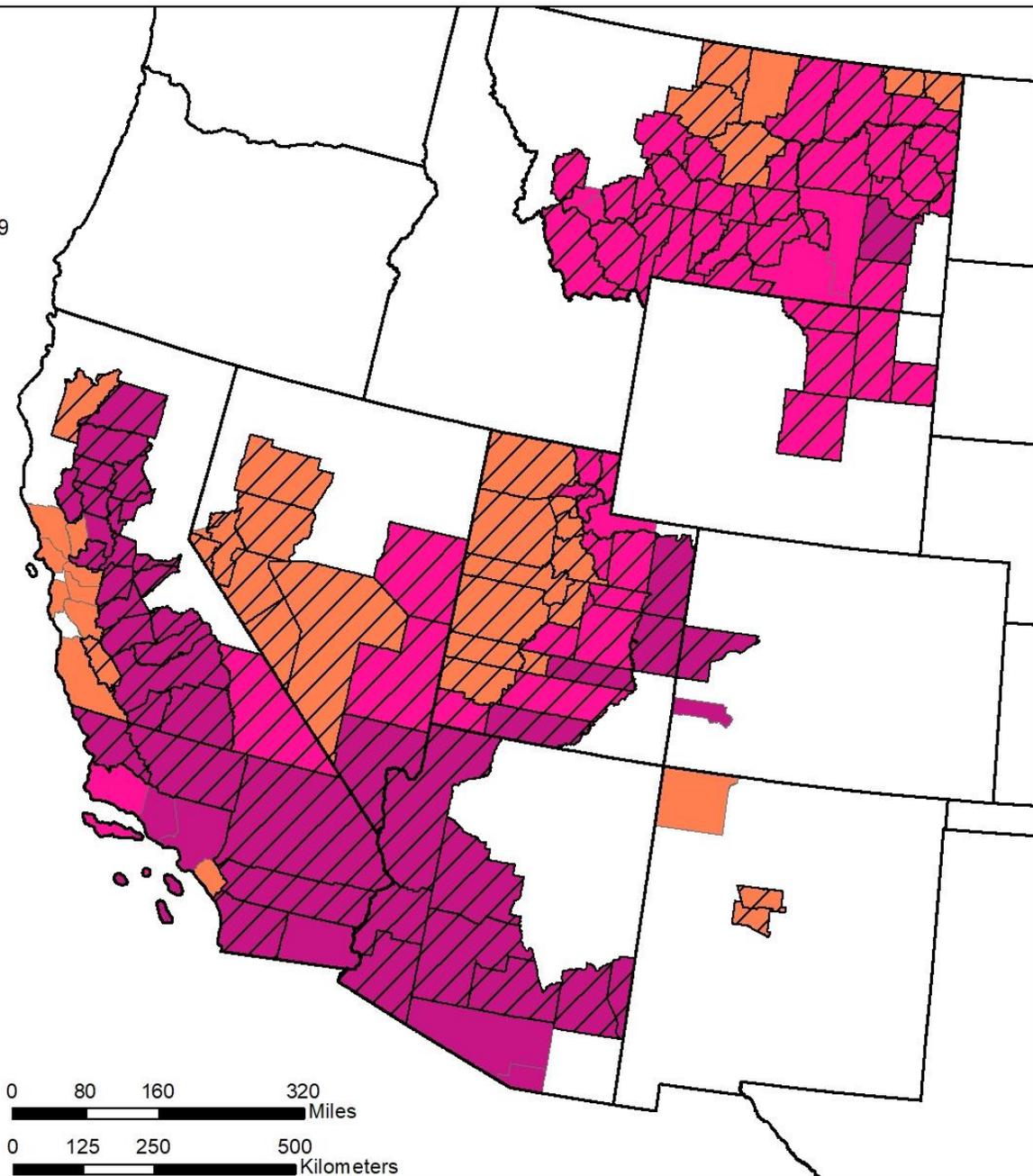
**Dr. David Hondula, PhD**, Associate Professor, School of Geographical Sciences and Urban Planning, Arizona State University



**Ginger Sykes Torres**, Vice-Chair, Environmental Quality and Sustainability Commission & Chair, Urban Heat Island Tree and Shade Subcommittee, City of Phoenix

### National Weather Service alerts in counties (June 15, 2021)

-  Excessive heat warning
-  Heat advisory
-  Fire weather
-  Percent fully vaccinated against COVID-19 under nat'l average (43.7%)



 **John Abatzoglou**  
@climate\_guy

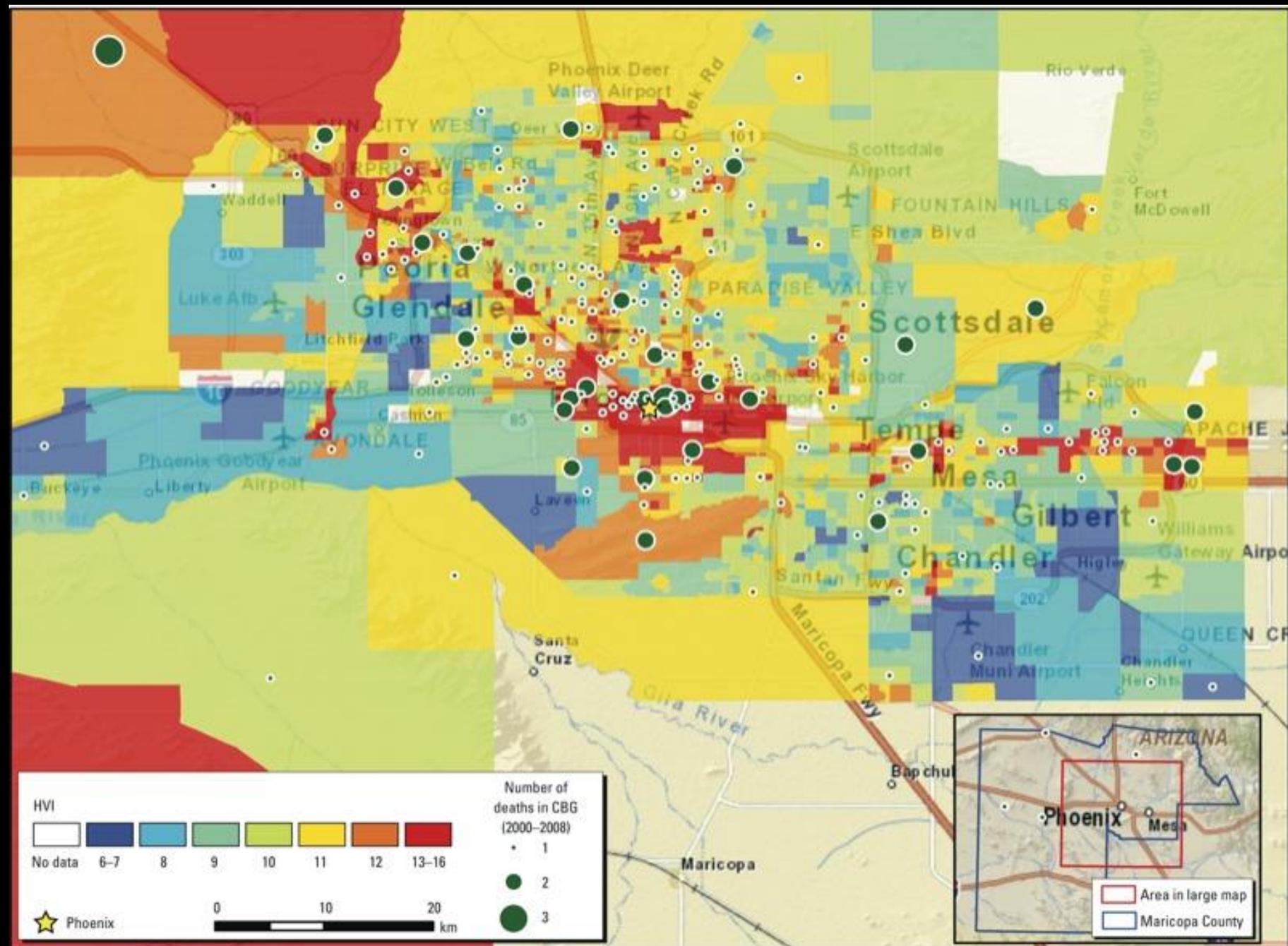
Finally, about half of the all-time high temperature records in the US occurred coincident with extreme drought. Dice are somewhat loaded, but still over a month from peak heat season  
[agupubs.onlinelibrary.wiley.com/doi/full/10.10...](https://agupubs.onlinelibrary.wiley.com/doi/full/10.10...)



Data Sources: 1. Centers for Disease Control and Prevention. Fully Vaccinated Adults as of 6/15/2021.  
<https://data.cdc.gov/Vaccinations/Fully-Vaccinated-Adults/jm79-dz78>

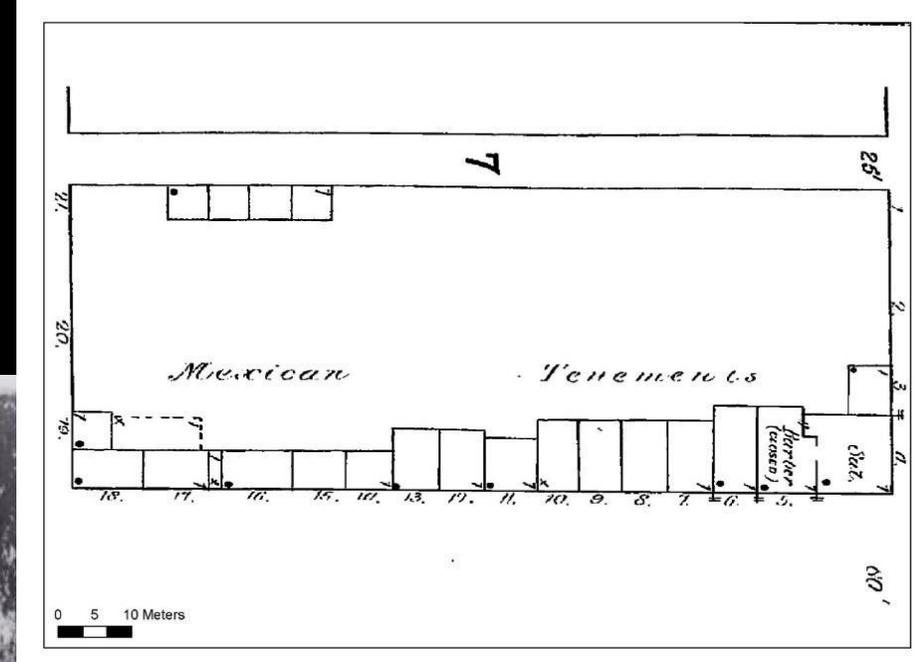
2. National Weather Service. Active Alerts as of 6/15/2021.

# Inequitable distribution of Urban Heat Island health risks



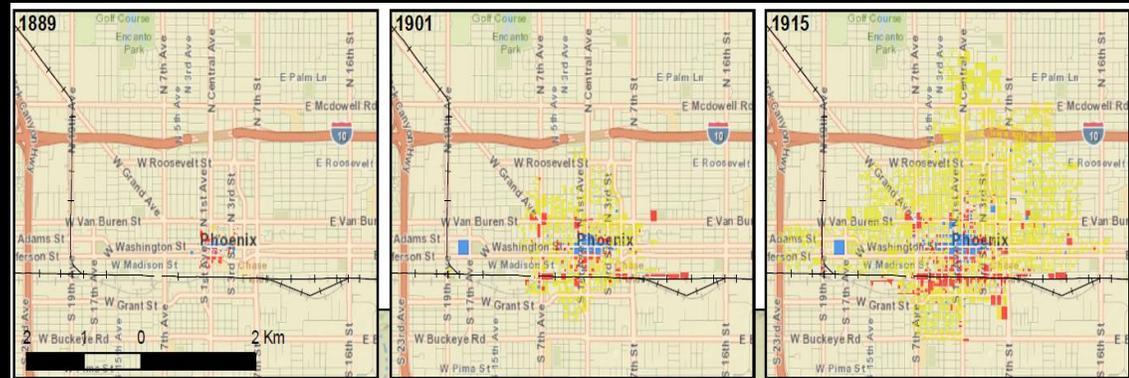
# Environmental Injustices in Phoenix were created by urban development & racism

Barry M. Goldwater Historic Photograph Collection. Arizona Collection, Arizona State University Libraries.



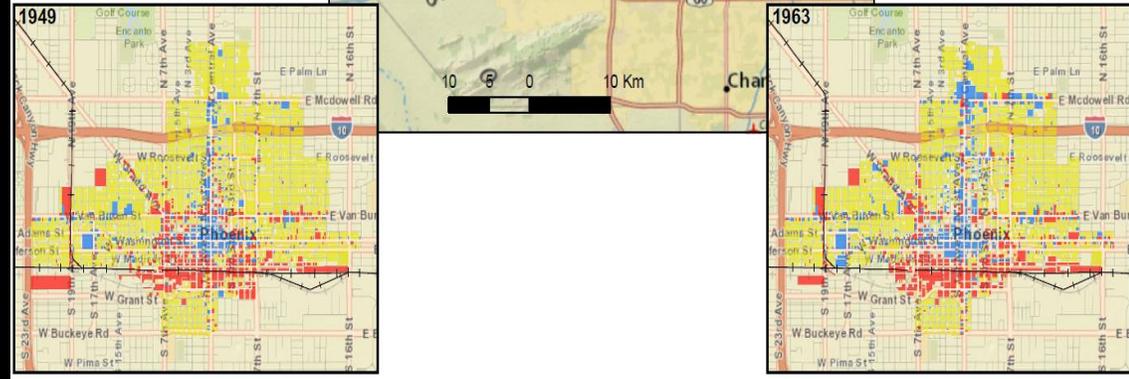
Oberle & Arreola (2008).

In the Negro section are some very good homes, considering their occupancy by colored people. Other houses in the area are cheap. There is within this area a mixed occupancy, including Mexicans, foreigners, etc.

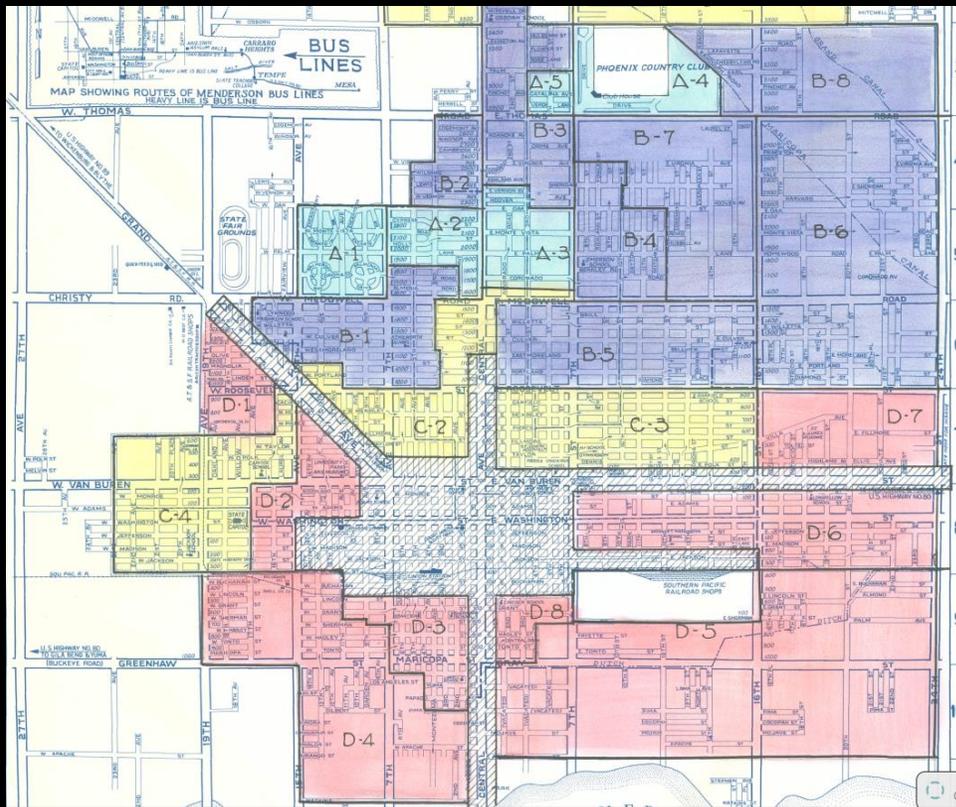


**Land Use**

- Residential
- Commercial/Institutional
- Industrial
- Area shown in detail maps
- Railroads (present day)



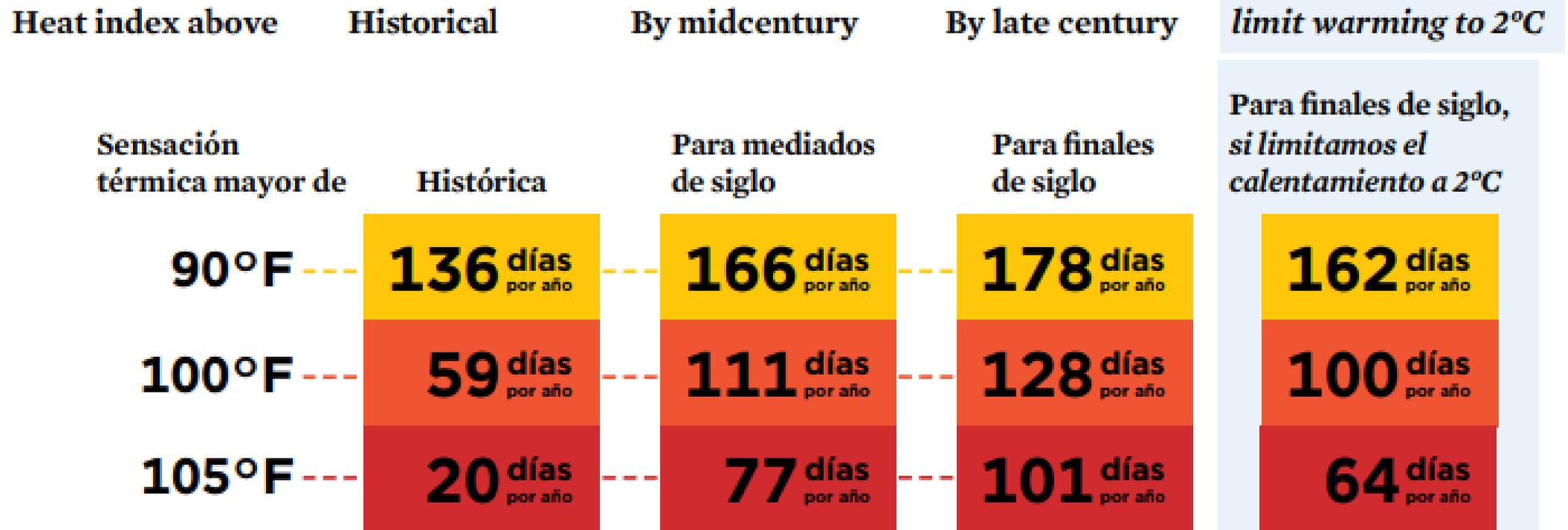
Delet-Barreto (2013).



Mapping Inequality: Redlining in New Deal America  
<https://dsl.richmond.edu/panorama/redlining/#loc=5/39.1/-94.58>

# With rapid & immediate action on climate we can limit the worst impacts for Phoenix

Annual Days of Extreme Heat Per Year in Arizona's 7th District



---

# THE HEAT IS ON IN MARICOPA COUNTY: HERE'S WHAT PUBLIC HEALTH IS DOING ABOUT IT

Climate and Health Program  
Office of Epidemiology  
Maricopa County Department of Public Health

Vjollca Berisha, Sr. Epidemiologist, Office of Epidemiology

[Vjollca.Berisha@Maricopa.gov](mailto:Vjollca.Berisha@Maricopa.gov)

City of Phoenix and Union of Concerned Scientists

June 22, 2021

# NEWS AND INFORMATION FOR COUNTY EMPLOYEES

**Heat is on!**

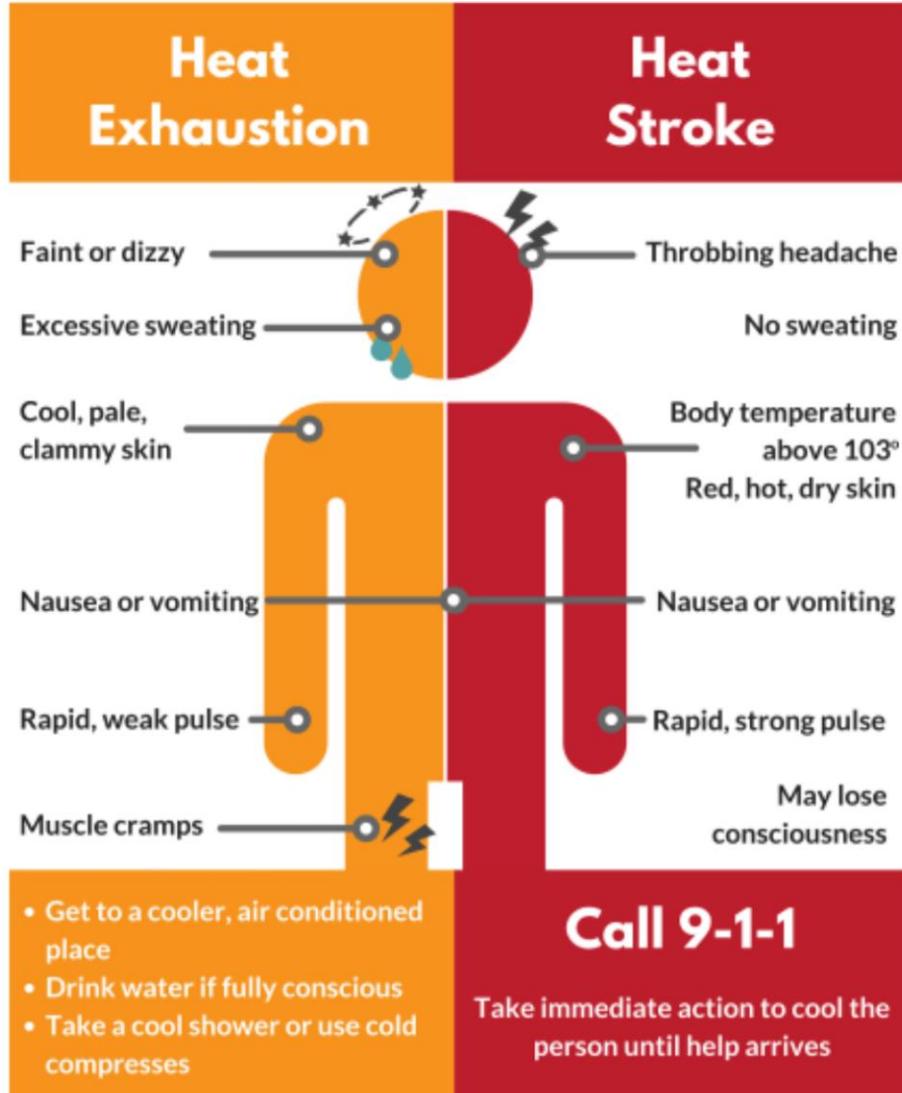
Use the App to Track Air quality

COVID-19 Community Impact Survey

Featured Video: Helping the Homeless

**Let's work together to save lives this summer!**

## Recognize Signs of Heat Illness



Used with permission from the National Weather Service

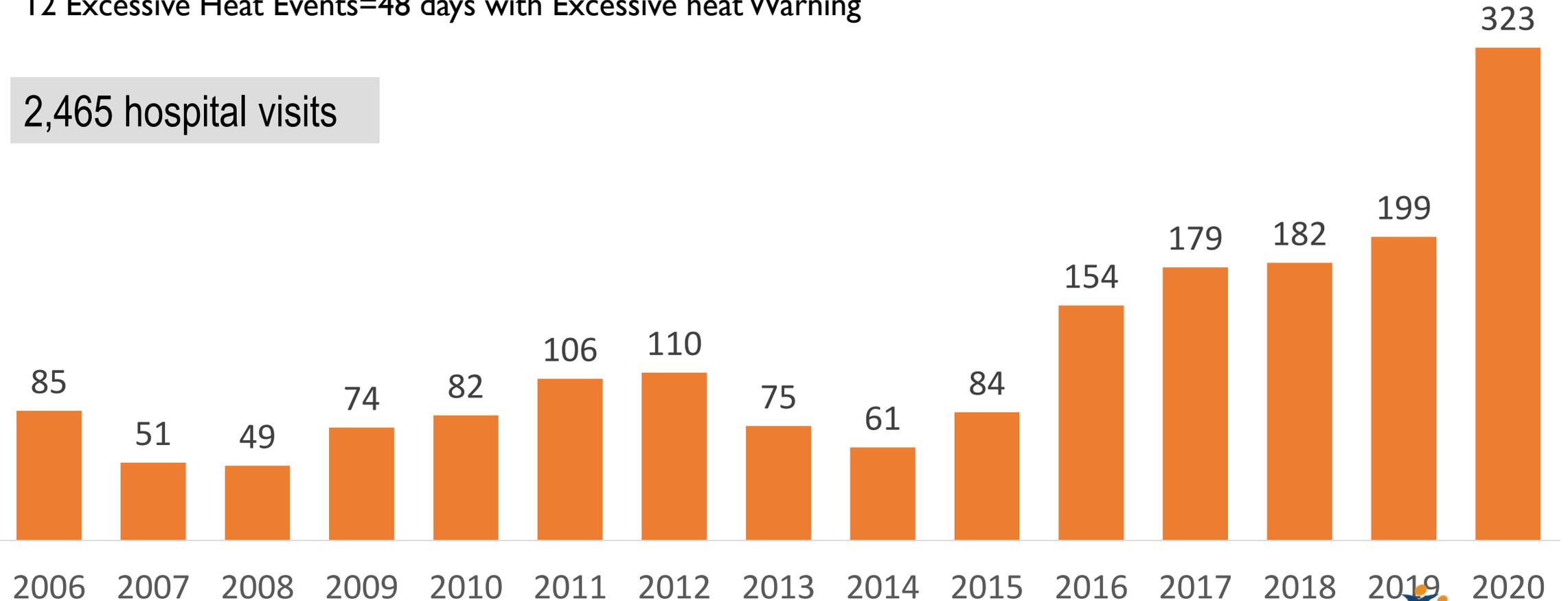
To prevent heat-related illness & death, public health provides education and recommends visiting community cooling centers for heat relief

[heataz.org](http://heataz.org)

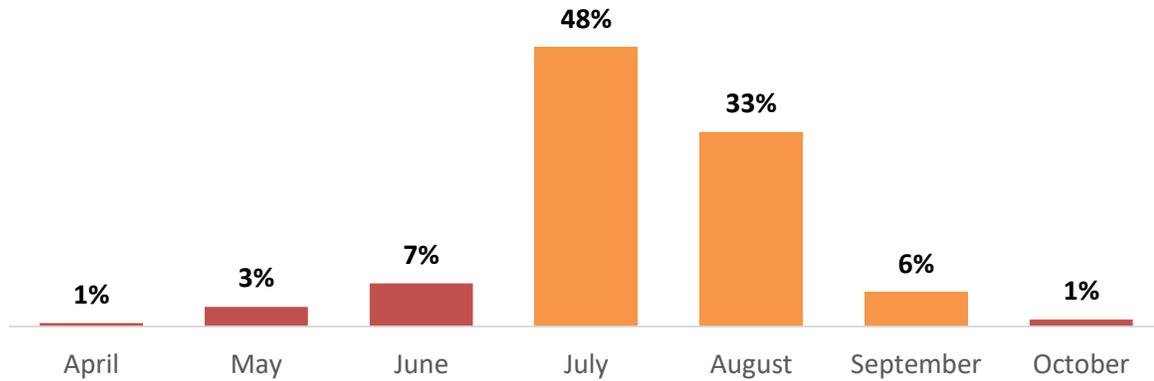
# Maricopa County had 1,814 heat-associated deaths from 2006 - 2020

12 Excessive Heat Events=48 days with Excessive heat Warning

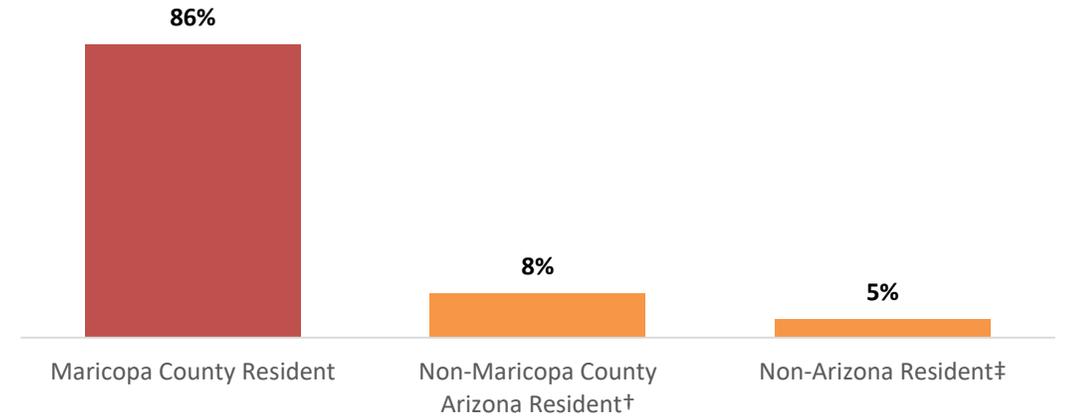
2,465 hospital visits



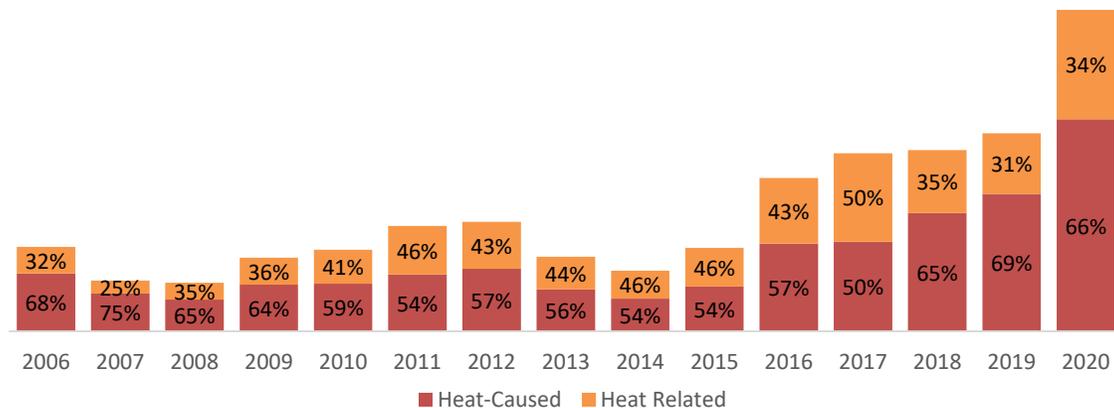
**Eighty-seven percent** of all heat associated deaths occurred in the months of July, August, and September (N=323).



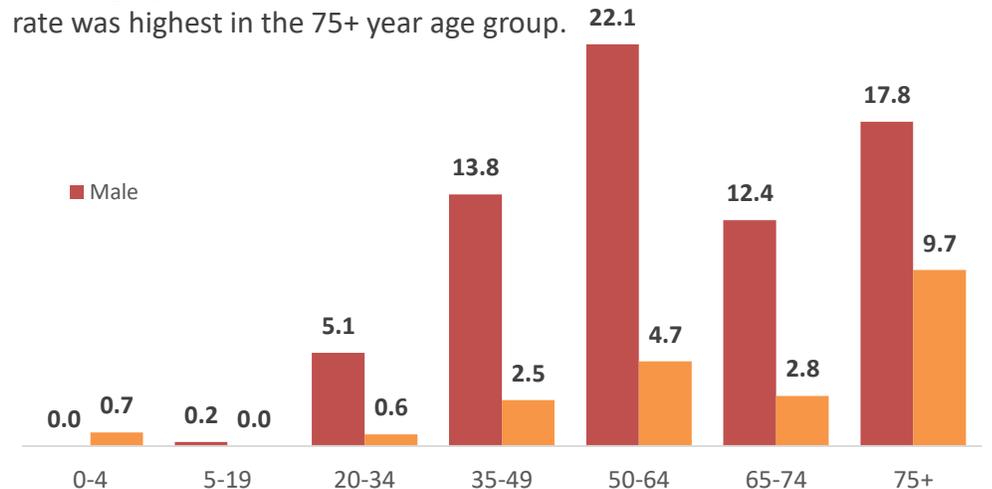
**Maricopa County residents** accounted for **86%** of all heat-associated deaths among cases with known county of residence.



**Sixty-one percent** of heat-associated deaths since 2006 have been classified as heat caused.



For males, the heat-associated death rate was highest in the 50-64 age group. For females, the heat-associated death rate was highest in the 75+ year age group.



# Some community members are at higher risk of heat-associated death

**6 in 10**

were at least  
50 years old

Certain races were  
disproportionately affected

Heat-Associated Death Rates	
Native American	5.8
African American	3.1
<b>All Races</b>	<b>2.4</b>

**63%**

had lived in  
Arizona for 20  
years or more



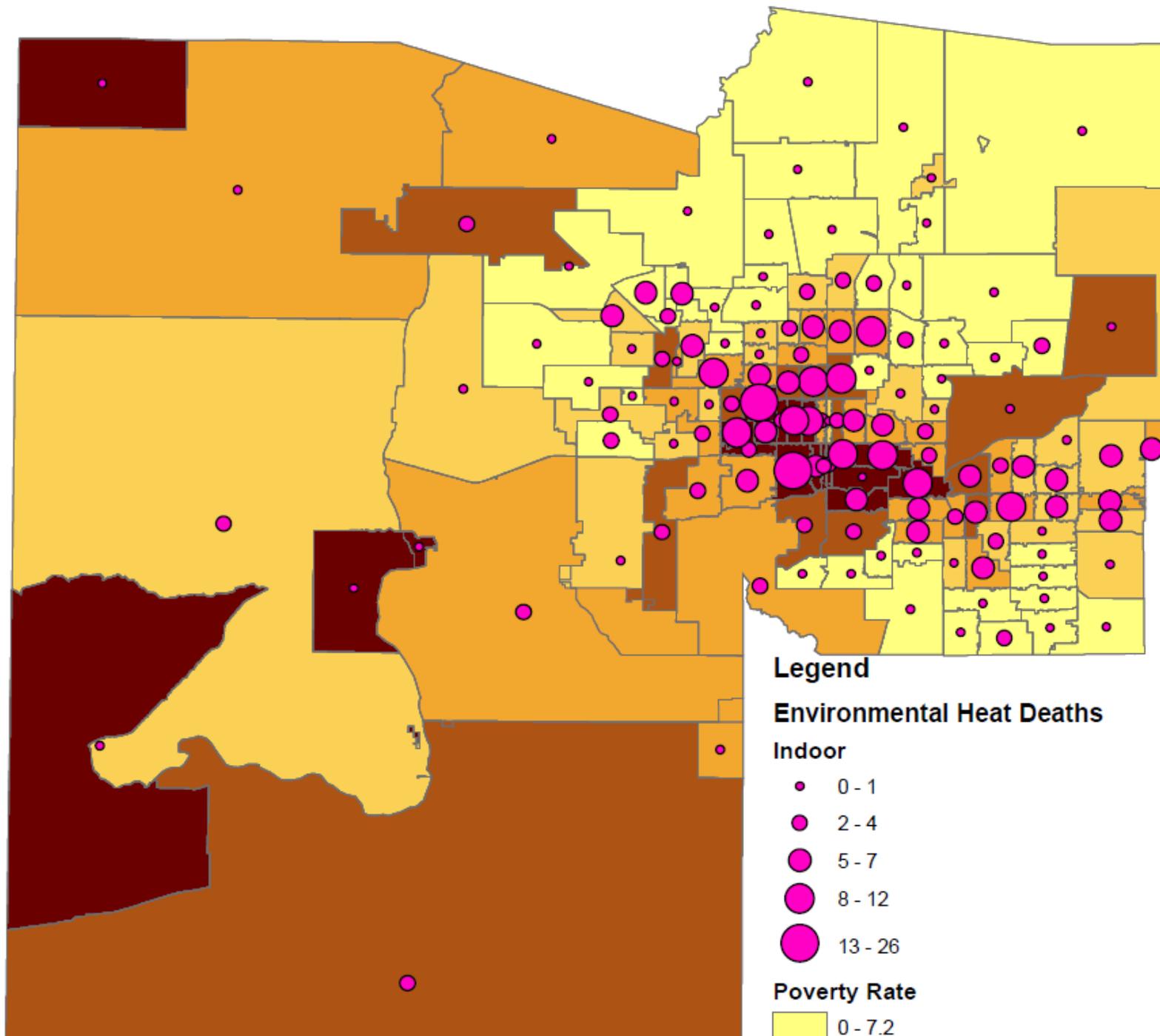
~30% of all  
heat deaths  
occurred indoors



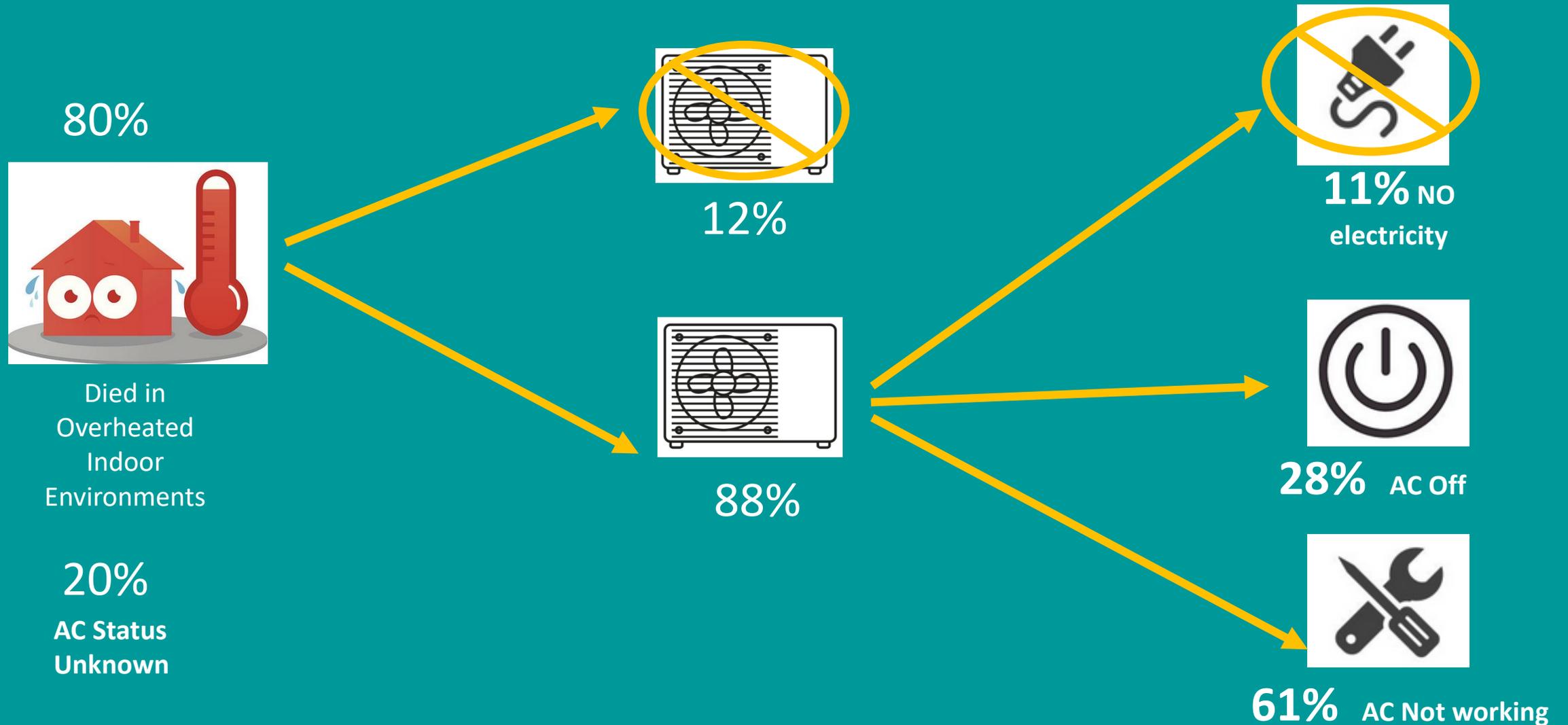
76% of all heat  
deaths occurred  
among men

[Heat Deaths by ZIP Code – Heat Story Map](#)

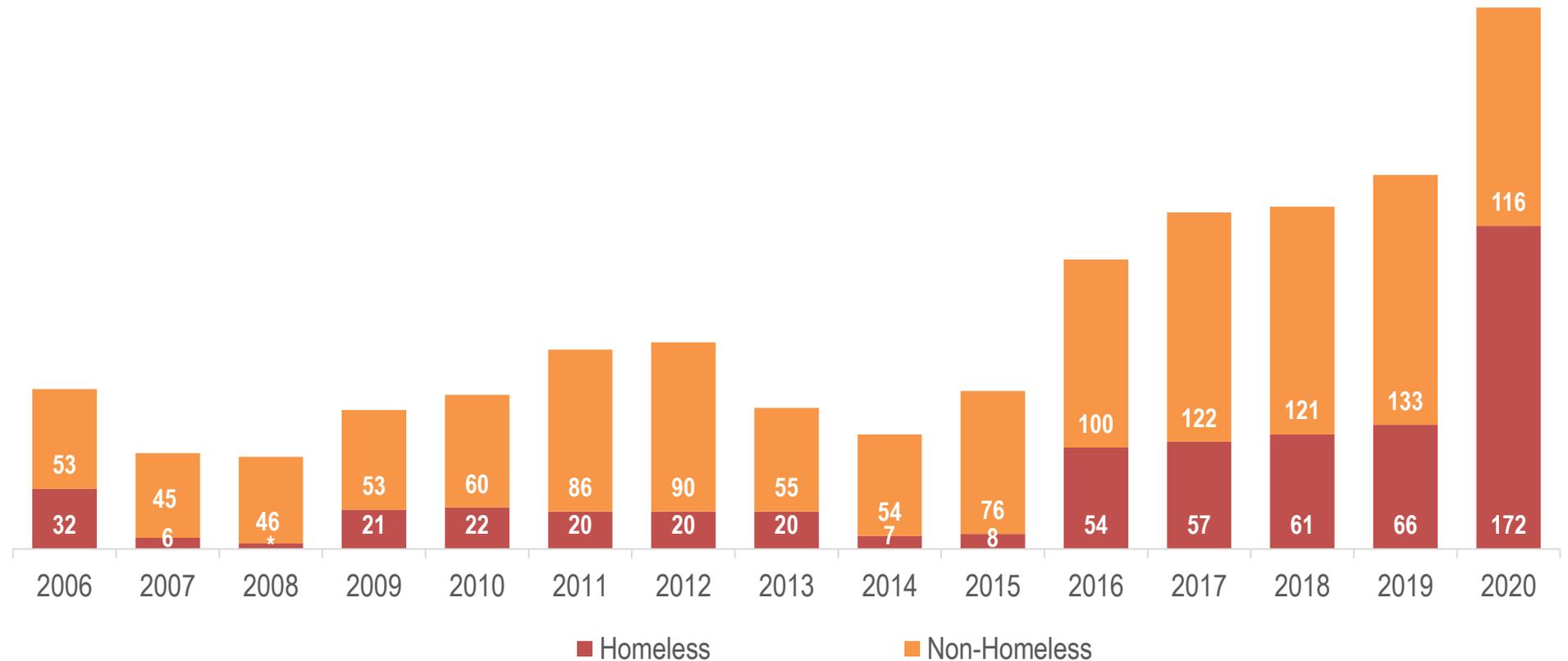
# HEATMAP OF INDOOR DEATHS BY POVERTY RATE (2006-2018)



# Why Are People Dying in Indoor Environments?



# THE NUMBER OF HEAT ASSOCIATED DEATHS AMONG THE HOMELESS POPULATION MORE THAN DOUBLED FROM 2019 TO 2020



## Annual Meeting of Bridging Climate Change and Public Health Coalition (2016-Present)



Reducing health related illness and death requires a collaborative approach!

## PROJECTS:

Raising Awareness about Extreme Heat, Safety Tips, and Available Community Resources Among Communities Living in Mobile Homes (ASU and CBO)

Energy Insecurity and Public Health:  
Going Further through Cross-Sector Collaboration (RWJF)

MC Celebrating Success and Champions



# ACTIONS TO CHANGE CULTURE OF HEALTH AMONG VULNERABLE COMMUNITIES

## Story Map About Heat: The Silent Killer

<http://bit.ly/HeatStoryMaricopa>

### Contact Information

- Aaron Gettel, Epidemiologist

[Aaron.Gettel@Maricopa.gov](mailto:Aaron.Gettel@Maricopa.gov)

Phone: 602-3722612

- Vjollca Berisha, Sr. Epidemiologist

[Vjollca.Berisha@Maricopa.gov](mailto:Vjollca.Berisha@Maricopa.gov)

Phone: 602-372-2611

**Stay Safe in the Arizona Heat**

- Drink plenty of water. *Never leave children or pets in the car.*
- Keep your head covered and reapply sunblock every 2 hours.
- Take breaks in the shade or in air conditioning.
- Plan outdoor activities in the early morning or late evening to avoid the heat.

Visit [heataz.org](http://heataz.org) or call 211 for information on cooling centers, utility assistance, and more tips on staying cool.

Maricopa County Public Health  
[WeArePublicHealth.org](http://WeArePublicHealth.org)

**Recognize Signs of Heat Illness**

Heat Exhaustion	Heat Stroke
Faint or dizzy	Throbbing headache
Excessive sweating	No sweating
Cool, pale, clammy skin	Body temperature above 103° Red, hot, dry skin
Nausea or vomiting	Nausea or vomiting
Rapid, weak pulse	Rapid, strong pulse
Muscle cramps	May lose consciousness

**Call 9-1-1**  
Take immediate action to cool the person until help arrives

- Get to a cooler, air conditioned place
- Drink water if fully conscious
- Take a cool shower or use cold compresses

Used with permission from the National Weather Service

## Bridging Climate and Public Health

<http://bit.ly/climatehealthmaricopa>

heataz.org

Draft Climate Action Plan Workshop Series | Extreme Heat

# Academic collaboration: supporting and evaluating urban heat solutions

David Hondula, ASU Urban Climate Research Center





¡Colecta 3 sellos para la oportunidad de ganar un premio!

1. Visita cada mesa
2. Obtenga un sello en su pasaporte
3. Entregue su pasaporte completo para ganar un premio

\$100 TARJETA DE REGALO  
RANCH MARKET

**Design Aspirations:** ASU research has purpose and impact and the university connects with communities through mutually beneficial partnerships

**ASU** Sustainable Cities  
Network  
Arizona State University

**ASU** Julie Ann Wrigley  
Global Institute of Sustainability  
Arizona State University

**ASU** Urban Climate  
Research Center  
Arizona State University



**ASU** School for the  
Future of Innovation  
in Society  
Arizona State University

**ASU** School of Geographical  
Sciences and Urban Planning  
Arizona State University

**ASU** College of  
Health Solutions  
Arizona State University

Healthy  
Urban Environments  
Initiative  
Arizona State University



**ASU** Center for Smart  
Cities and Regions  
Arizona State University

**ASU** Decision Center  
for a Desert City  
Arizona State University



Central Arizona-Phoenix  
Long-Term Ecological Research  
**CAP LTER**

**ASU** Herberger Institute for  
Design and the Arts  
Arizona State University

**15+ academic units and  
major initiatives  
supporting urban heat  
research**

**ASU** Knowledge Exchange  
for Resilience  
Arizona State University

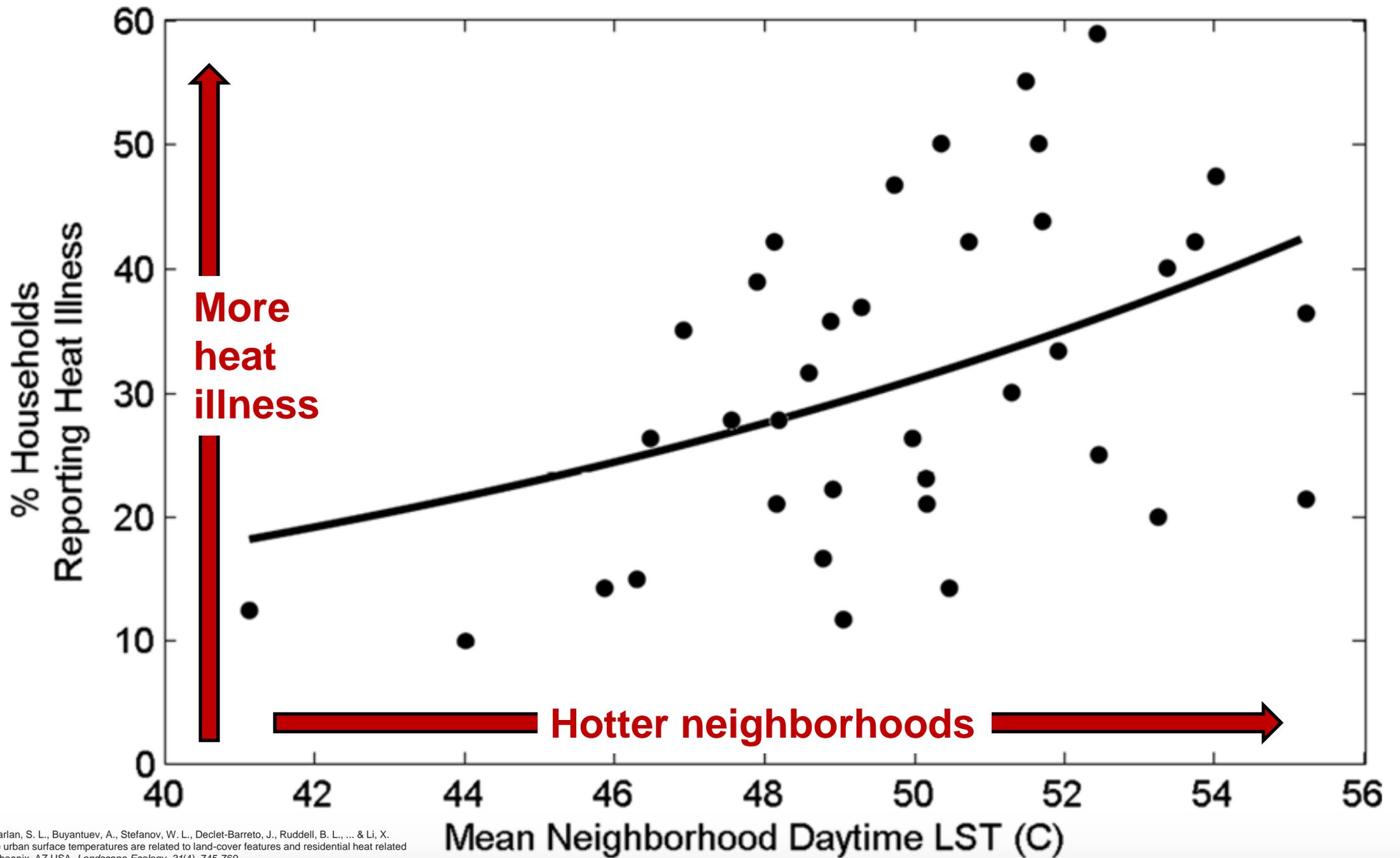


# 36%

Phoenix respondents reporting symptoms of heat illness  
(Hayden et al. 2011)

# 27%

Maricopa County households reporting that they “sometimes”  
feel too hot inside their homes in the summer  
(MCDPH CASPER)



# Community-driven heat action planning



Heat Action Planning Guide  
FOR NEIGHBORHOODS OF GREATER PHOENIX



Heat Action Plan  
for Edison-Eastlake  
Community



Heat Action Plan for  
Mesa Care Neighborhood



Heat Action Plan for  
Lindo Park/Roesley  
Park Neighborhoods

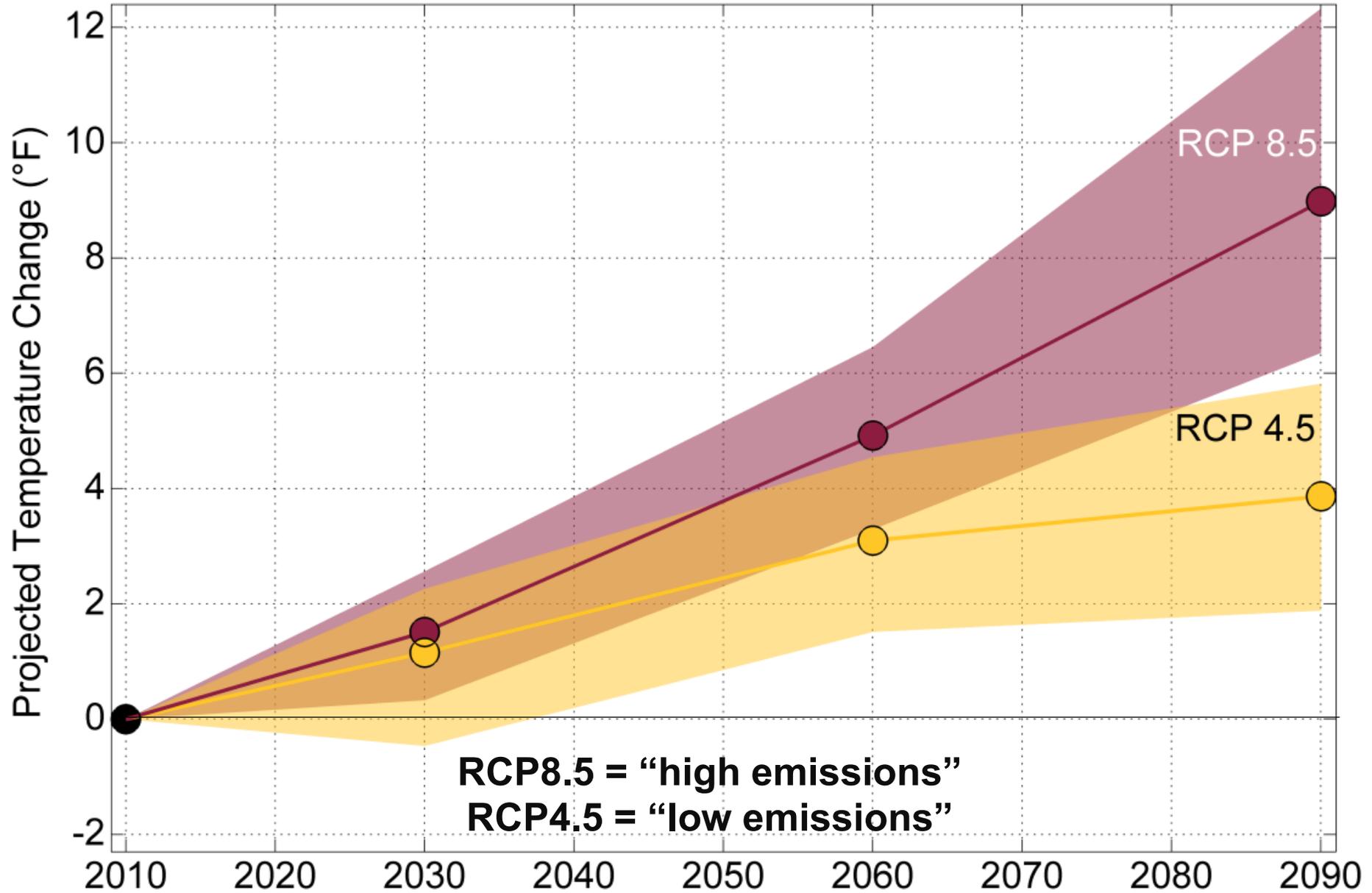
# Mapping Hot & Cool Spots





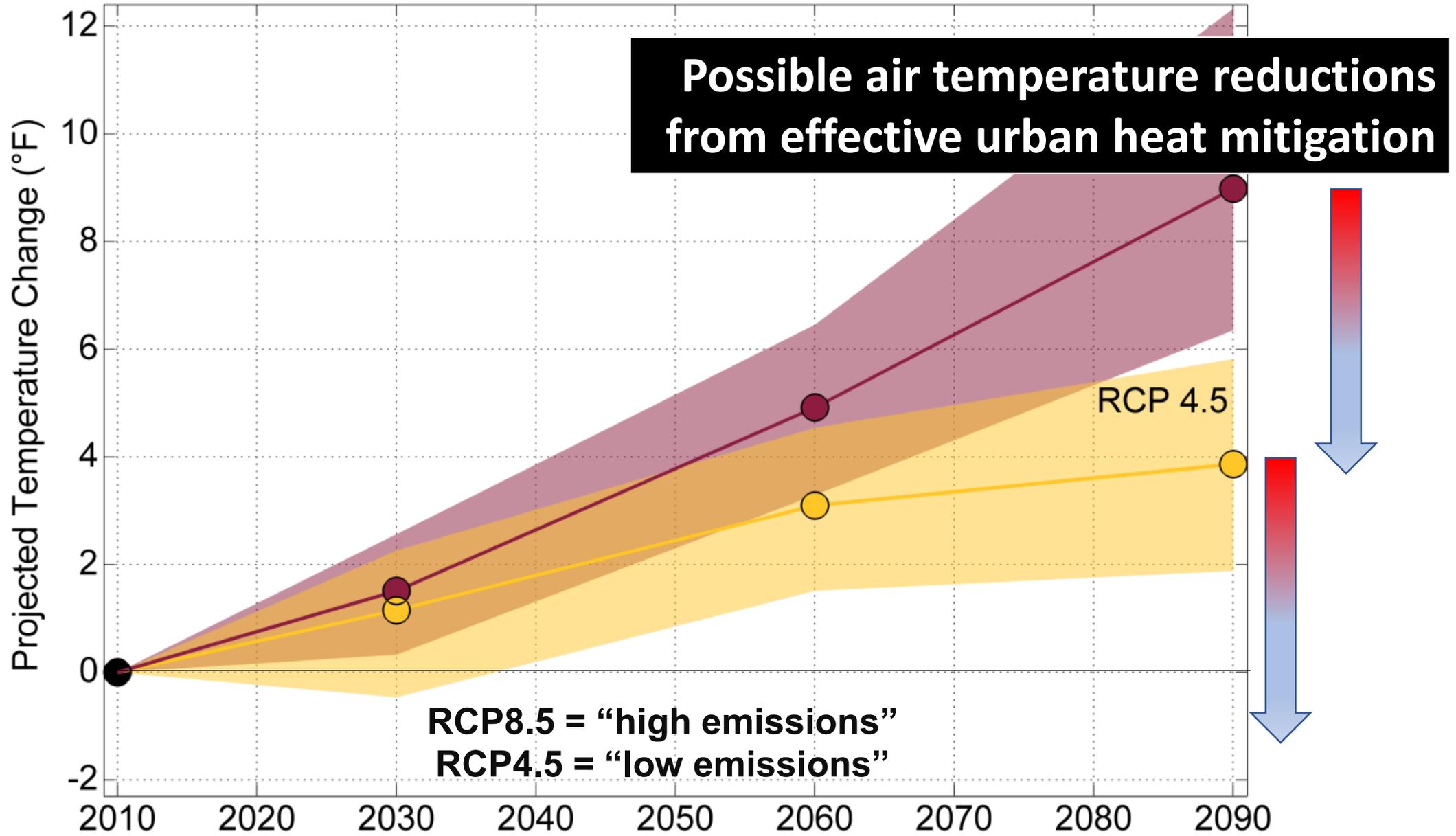
**Mitigation Potential**

Projected Change in the Temperature of the 10th Hottest Day of the Year  
Arizona Statewide Average



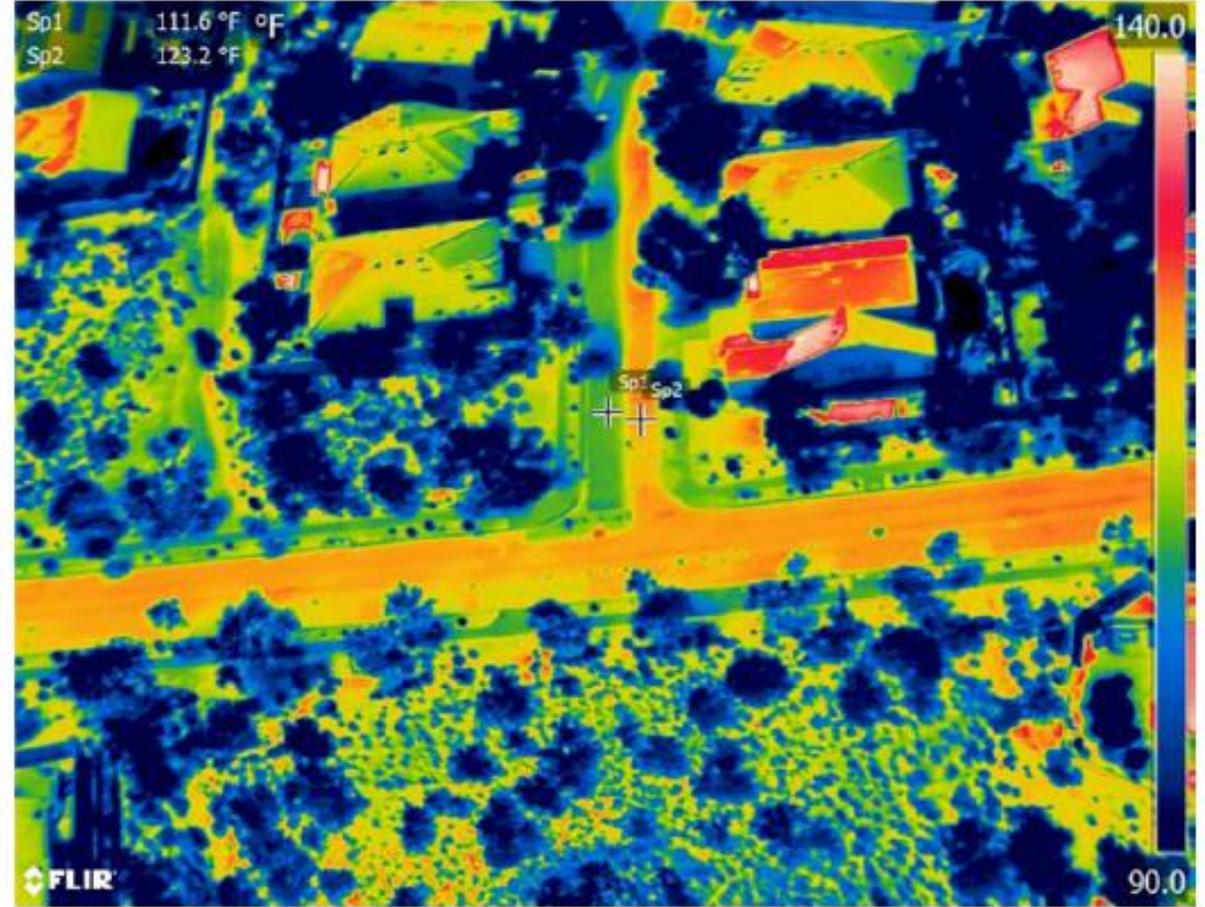
**Mitigation Potential**

Projected Change in the Temperature of the 10th Hottest Day of the Year  
Arizona Statewide Average



# Evaluating Heat Mitigation Strategies – Cool Pavement Pilot Project

## Helicopter Overflights



## Supporting Cool Corridor Prioritization & Implementation

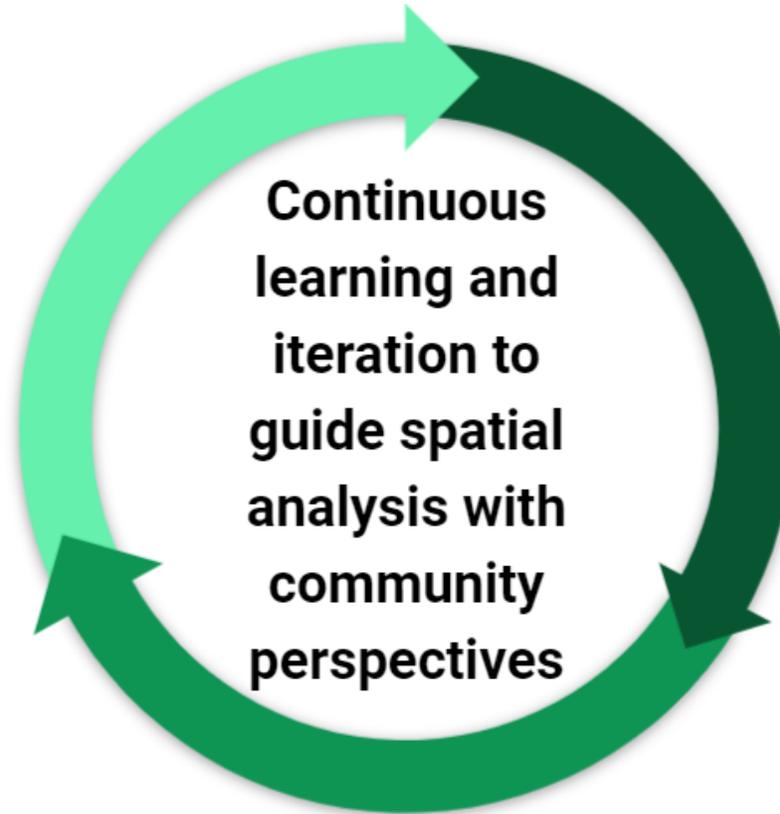
### Cool Corridor Concept Definition

Determine key features of cool corridors (environmental, social, infrastructure, etc.)

Acquire relevant data sets; implement selection algorithm

Identify existing best practices and examples in Phoenix

Propose examples to community, receive feedback



### Cool Corridor Prioritization

Determine key characteristics of **neighborhoods** to be prioritized for cool corridors

Acquire relevant data sets; implement prioritization algorithm

Propose prioritized set of neighborhoods; receive feedback

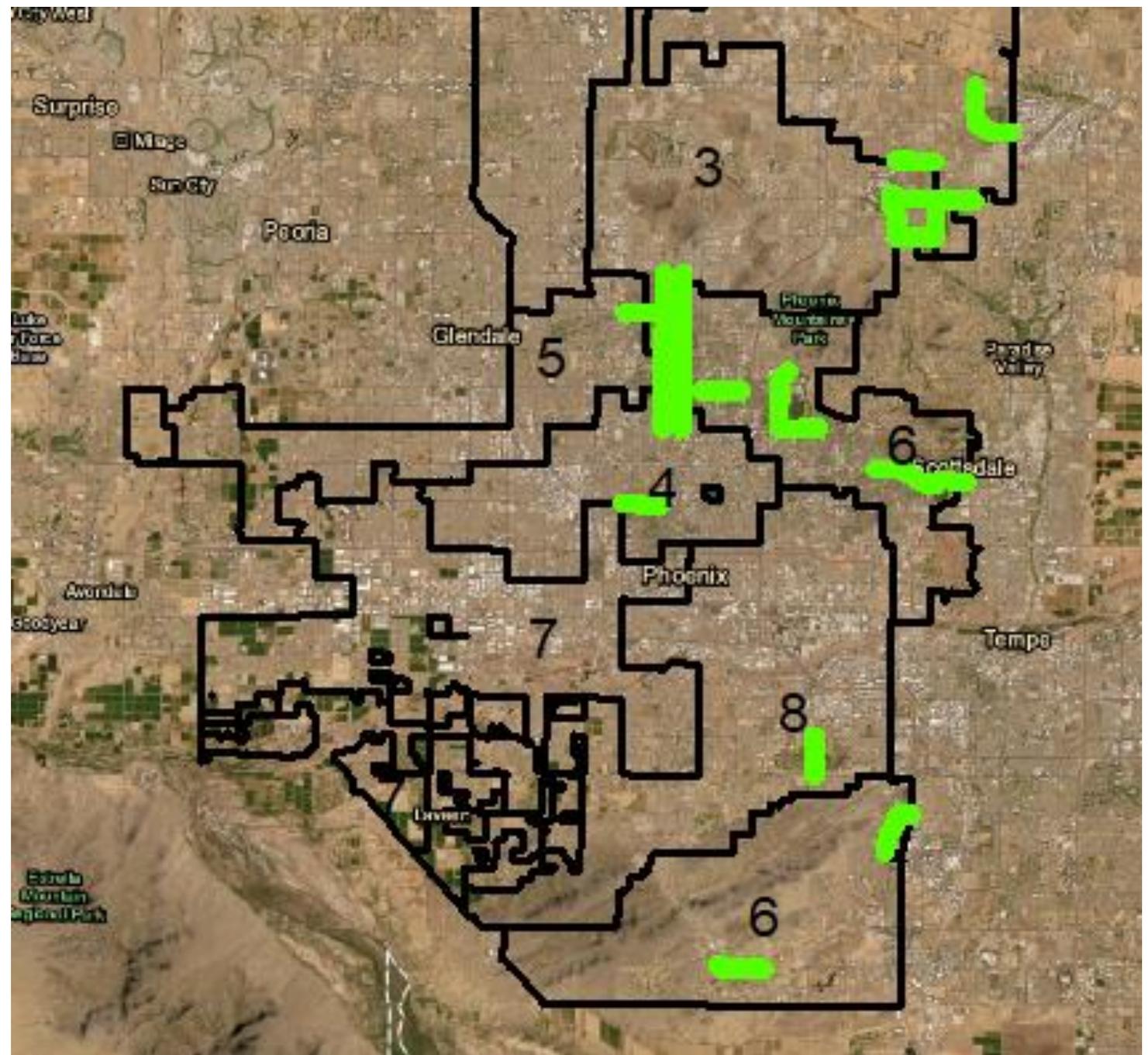
### Suitability Assessment

Assess opportunities and conflicts on the **streetscape**

Develop strategies for “cooling” corridors

Propose implementation projects; receive feedback

# 25 best examples of cool corridors (PRELIMINARY)



**“Current cool corridor” example  
District 8 32<sup>nd</sup> Street, Broadway-Southern  
(PRELIMINARY)**



Draft Climate Action Plan Workshop Series | Extreme Heat

# Academic collaboration: supporting and evaluating urban heat solutions

David Hondula, ASU Urban Climate Research Center



**E-mail: [David.Hondula@asu.edu](mailto:David.Hondula@asu.edu)**

**Twitter: [@ASUHondula](https://twitter.com/ASUHondula)**



# **Community Input for Heat Readiness & Tree and Shade Initiatives in the City of Phoenix**

Presentation for the City of Phoenix Climate Action Plan  
Heat Workshop

By Ginger Sykes Torres



## Heat Readiness at the Community and City Level

With temperatures rising it is more important than ever to address heat issues in our city and enhance shade for pedestrians and those in the most heat vulnerable areas.

Phoenix is exploring ways to address the impacts of rising heat and add more trees throughout the city via projects like cool corridors and through creative partnerships with NGOs and community organizations.

In the past few years, community input via citizen led advisory committees (EQSC and UHITS) has been integral to facilitating City adoption of policies and initiatives that aim to make our communities and environment more resilient to extreme heat and expand shade cover.

## Planning for Trees in Phoenix: 2010 Tree and Shade Master Plan

Plan adopted a 25% tree and shade canopy goal by 2030

2021: Phoenix is "short of what is needed to reach 25 percent canopy" and meeting the goal will require about 10,000 new trees be planted each year — more than double the current rate. (For reference, in 2019, Phoenix planted 4,509 trees and lost about 1,200, so the city's tree inventory only grew by 3,309.)

→ In 2019, UHITS/EQSC provided Recommendations on Implementation of the 2010 Tree and Shade Master Plan to Phoenix City Council.





## Phoenix City Budget Funding for Trees & Heat Resilience Programs

The approved 2021-2022 City budget includes \$2.8M for Climate Change and Heat Readiness initiatives to boost Phoenix's response to climate change, with a new Office of Heat Response and Mitigation created as part of the package. The new office will oversee tree and shade distribution in the city. Budget also funds planting 1,800 trees in cool corridors in heat vulnerable areas. Also funds additional Parks staff and a citywide tree inventory and database that will help to accomplish the city's 2010 Tree and Shade Master Plan goals.

→ In 2021, UHITS/EQSC provided a business case for the Urban Forest Infrastructure Manager Position to City Council and the City Manager's office.

---

## City of Phoenix Tree Equity MOU with American Forests (2021)

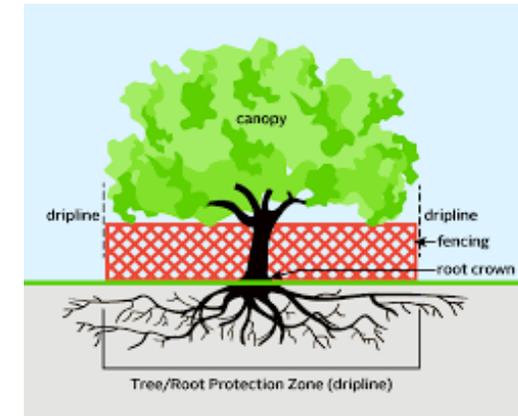


Through this MOU, American Forests and the City of Phoenix will work together to achieve “tree equity” by 2030. The two will work with neighborhood groups, nonprofits, businesses and researchers to identify inequities and attract funding to preserve existing trees and plant new ones. The MOU allows the two entities to focus on growing urban forests in heat vulnerable communities.

-->This MOU was supported by EQSC.

---

## Zoning Code: Approved Landscape Maintenance Text Amendment (June 2021)



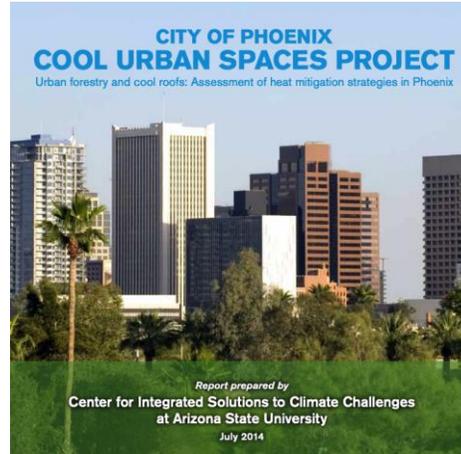
Strengthens the existing zoning ordinance and codifies best practices by embracing 3 core concepts: trees are infrastructure, trees provide benefits when appropriately planted, & trees should be kept in place in a healthy and living condition.

Applies to commercial, industrial, & multifamily/single family subdivisions, NOT individual homeowners. Details that site inspection and certificate of occupancy are tied to the fact that the landscape that was said would be put in is actually in, that the approved landscape plan on file is the valid document guiding landscaping on the site, provides clarity and consistency on design guidelines, addresses the concept of “right tree right place” with regard to plant materials, & tree protection zone to preserve existing trees, landscape removal standards, installation and maintenance plans, and salvage and tree protection plans.

→ Final Landscape Text Amendment Approved by EQSC with additional TPZ language recommended.

---

## What is next?



Goal: To build upon the heat readiness and tree/shade initiatives and continue to seek community-driven, equitable solutions, that prioritize the most vulnerable first.

- Climate Action Plan - Heat Resiliency Goals
- UHITS: Investigating Cool Rooftops Policy Recommendations, Additional Planning/Zoning Code Recommendations for Low Impact Development and Green Infrastructure
- EQSC/UHITS: Recently Approved Citywide Cool Corridors Recommendations

---

# Citywide Cool Corridors Policy Vision



- A citywide Cool Corridors Program would support existing city goals related to sustainability, public health, and alternative modes of transportation.
- Cool corridors directly address heat/health/equity concerns
- Continued demonstration of national and international heat leadership by City of Phoenix
- Existing programs can and should be leveraged to assist in implementing the Cool Corridors vision

→ Recommendations for the development of a citywide Cool Corridors Program were unanimously approved by the UHITS Subcommittee on April 6th, 2021 and by EQSC on June 10th, 2021.

---

## Citywide Cool Corridors Key Recommendations

1. Clear definition of cool corridors, identify “best” examples
2. Prioritize heat vulnerable communities and high pedestrian activity/need street segments
3. Robust and broad stakeholder engagement: residents, staff, researchers, advocacy groups
4. Evaluation and accountability



---

## Citywide Cool Corridors Definition



1. Mile-long walkway, pathway, or trail serving residents who walk, bike, and use transit
2. Offers residents of all ages and abilities relief from hot weather through shade provisioning and other resources
3. At least 30% shade coverage
4. Connect residents to critical services
5. Align with other plans/goals/frameworks/initiatives
6. Include displays and signage about heat services/resilience



# 2021 Draft Climate Action Plan: Heat Resilience

## Significant Climate Actions related to heat:

- Become a top tier Heat-Ready City by 2025—implementing the Tree and Shade Master Plan by 2030 and building a network of 200 “cool corridors” by 2050.
- Create an inclusive and equitable city, prioritizing investments in previously underserved communities, proactively seeking community input on all major climate policy and related budget decisions and embedding equity in all climate actions.

## 2050 Resiliency Goal

- Heat: Reduce urban heat-island effect through green infrastructure as well as doubling the current tree and shade canopy to 25 percent. Have all residents within a five-minute walk from a park or open space by adding new parks or open space in underserved areas, adding 150 miles of paths, greenways, and bikeways throughout the city, and transforming an additional 150 miles of canals into vibrant public space.

# Panel Discussion



Please feel free to ask your questions in the chat.

## SPEAKERS:



**Dr. Juan Declet-Barreto, PhD**, Senior Social Scientist for Climate Vulnerability, Union of Concerned Scientists



**Dr. Vjollca Berisha, MD**, Senior Epidemiologist, Climate and Health Program, Maricopa County Department of Public Health



**Dr. David Hondula, PhD**, Associate Professor, School of Geographical Sciences and Urban Planning, Arizona State University



**Ginger Sykes Torres**, Vice-Chair, Environmental Quality and Sustainability Commission & Chair, Urban Heat Island Tree and Shade Subcommittee, City of Phoenix

# Share your Opinions and Ideas

## Climate Page, Survey, Future Workshop Information

[www.phoenix.gov/climate](http://www.phoenix.gov/climate)

Submit questions to  
[climate@phoenix.gov](mailto:climate@phoenix.gov)



[@phxenvironment](https://twitter.com/phxenvironment)

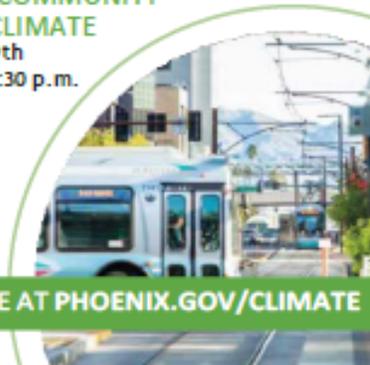


## THE FUTURE OF PHOENIX DRAFT CLIMATE ACTION PLAN

Join the City of Phoenix and provide your input on addressing climate change. Share your concerns, needs, and ideas to co-create solutions. Your collaboration is needed to help the City determine priorities, needs, and opportunities to address climate change.

### VIRTUAL WORKSHOP SERIES:

- |  |  |
|--|--|
| <b>BUSINESS AND CLIMATE</b><br>June 16th<br>11:30 - 1:00PM | <b>COUNCIL D7 AND D8</b><br>June 26th<br>10:00 - 11:30AM           |
| <b>WATER AND CLIMATE</b><br>June 17th<br>5:00 - 6:30PM     | <b>YOUTH CLIMATE</b><br>June 26th<br>3:00 - 4:30PM                 |
| <b>HEAT AND CLIMATE</b><br>June 22nd<br>11:00 - 12:30PM    | <b>YOUR COMMUNITY AND CLIMATE</b><br>June 29th<br>5:00 - 6:30 p.m. |



Help plan the Future of Phoenix

REGISTER ONLINE AT [PHOENIX.GOV/CLIMATE](http://PHOENIX.GOV/CLIMATE)



## **Meet with other Union of Concerned Science Members and make our collective voices heard.**

**June 24 – 5:00 pm MST Register Here**

**<https://us02web.zoom.us/meeting/register/tZMpf-CpqTsuH9NwzkVNpkTpN9KzIYenAtXR>**

Join us for a follow up discussion about how we come together to make our voices heard loud and strong. At this Zoom meeting we will discuss strategy to mobilize a united effort for Phoenix and our state. We need to coordinate our effort across the state as well as push for the federal jobs, infrastructure package to give the cities the resources to take the aggressive action needed.

Heat Index  
Above 90°F



Outdoor workers become more susceptible to heat-related illness.

Heat Index  
Above 100°F



Children, elderly adults, pregnant women, and people with underlying conditions are at heightened risk of heat-related illness.

Heat Index  
Above 105°F



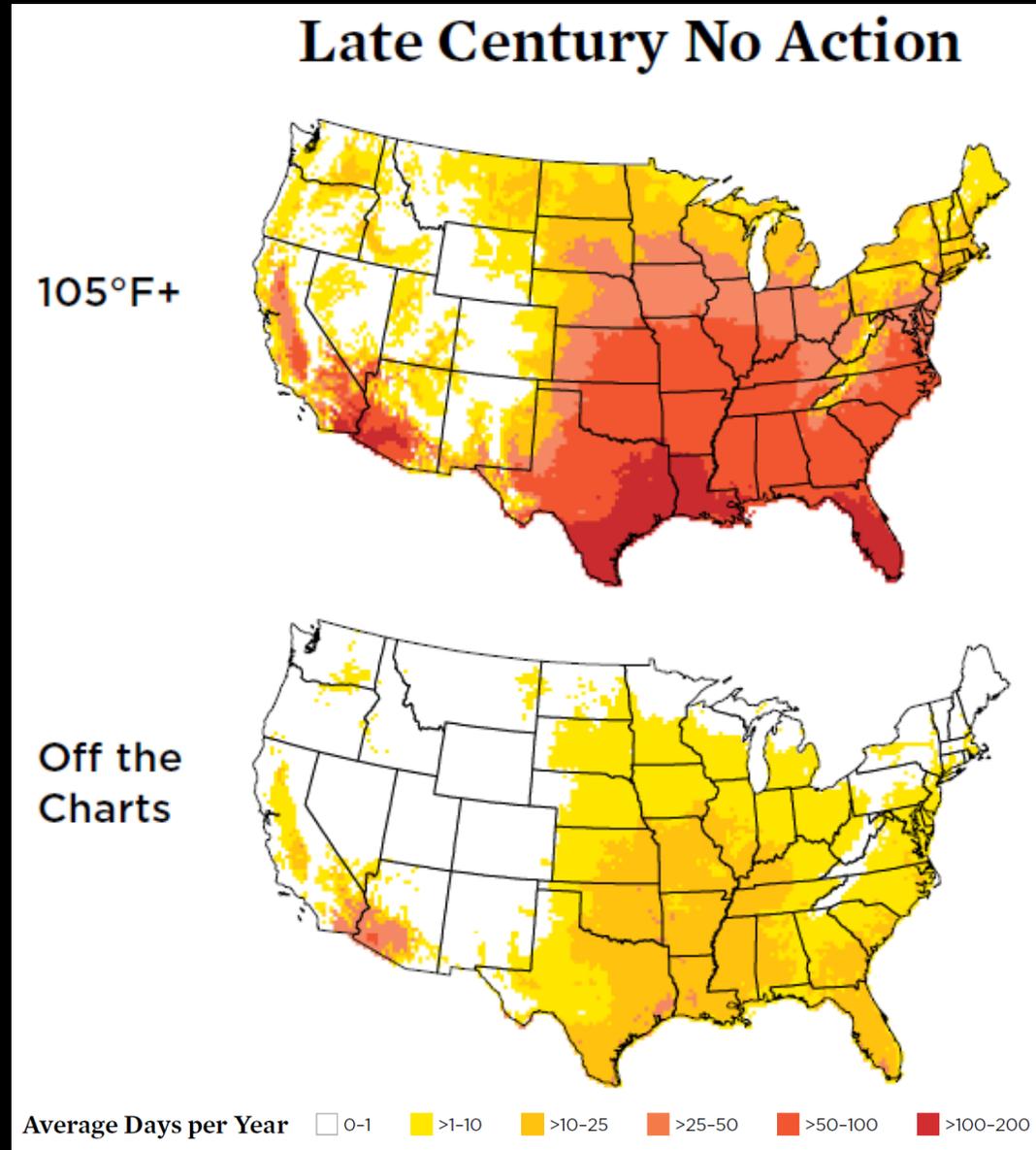
Anyone could be at risk of heat-related illness or even death as a result of prolonged exposure.

Heat Index  
Off the Charts



Undetermined: any level of exposure is presumed extremely dangerous for all people and likely to result in heat-related illness or even death.

# Late century: Unprecedented heat



# Taking action now would limit expansion of heat

**Late Century No Action**



**Late Century Rapid Action**



**Cities Experiencing Heat Index >105°F**

- More than 30 Days per Year
- More than 30 Days per Year, Historically
- Fewer than 30 Days per Year

# Resources

- Curated Phoenix timeline  
<http://tommybleasdale.com/timeline/timeline.html>
- Oberle, A. P. and D. D. Arreola (2008). Resurgent Mexican Phoenix. Geographical Review 98(2),
- 171–196.