

Update on Trees and Shade

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AZ CHAPTER OF AMERICAN SOCIETY OF LANDSCAPE ARCHITECTS



Agenda

- Who is Lora Martens and how did she get here?
- Heat 101
- Office of Heat Response and Mitigation Overview
- Spring highlights
- ARPA grant programs
- Tree data
- Tree and Shade Master Plan Update





olmstedfanfiction



Literally everything

Is this ...landscape?



27 likes

olmstedfanfiction ENLIGHTEN ME

December 23, 2018





DAVIS
BIKEWAY

ROUTE







Steve Martino Landscape Architects



Arterra Landscape Architects



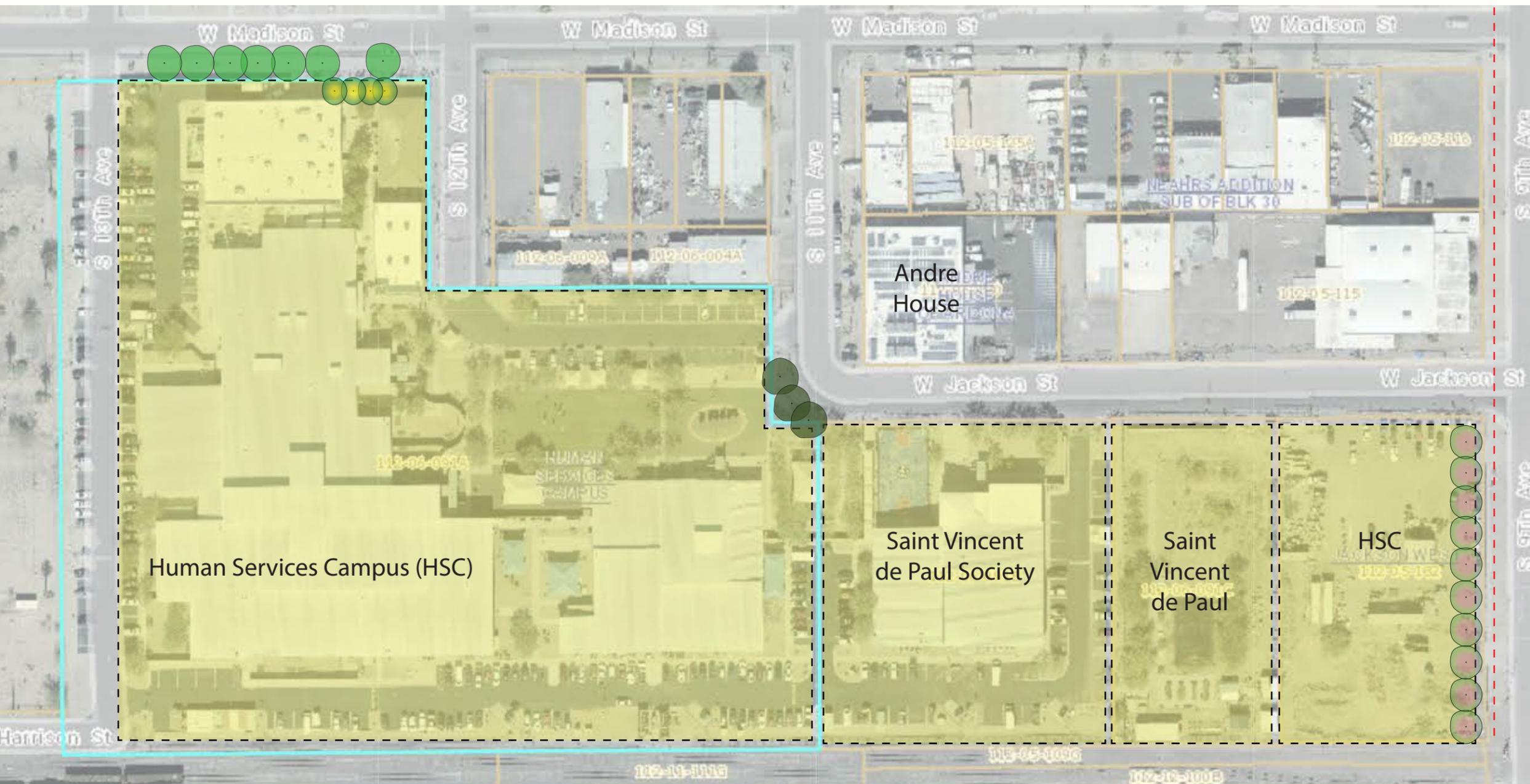
NO TRESPASSING - PROHIBIDO EL PASO
VIOLATORS WILL BE PROSECUTED IN ACCORDANCE WITH A.R.S. 13-1502-A1
TRANSGRESORES SERAN ENJUICADOS EN ACCORDANCE CON A.R.S. 13-1502-A1
PRIVATE PROPERTY - PROPIEDAD PRIVADA



© 2021 Google

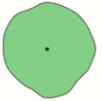
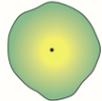
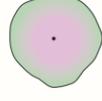
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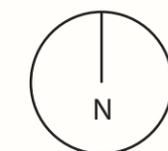
LEGEND

Proposed Spring 2022 Planting - HSC

- 
 Ulmus parvifolia
 Size: 36" Box +
 Location: HSC ROW
 Irrigation: Extension of current landscape irrigation
 Quantity: 7
- 
 Corymbia papuana
 Size: 24" box
 Location: HSC Private Property
 Irrigation: Extension of current landscape irrigation
 Quantity: 4
- 
 Ulmus parvifolia
 Size: 15 gallon
 Location: HSC Private Property
 Irrigation: Extension of current landscape irrigation
 Quantity: 3
- 
 Dalbergia sissoo
 Size: 15 gallon
 Location: HSC Private Property
 Irrigation: Extension of current landscape irrigation
 Quantity: 10

Total: 24 Trees

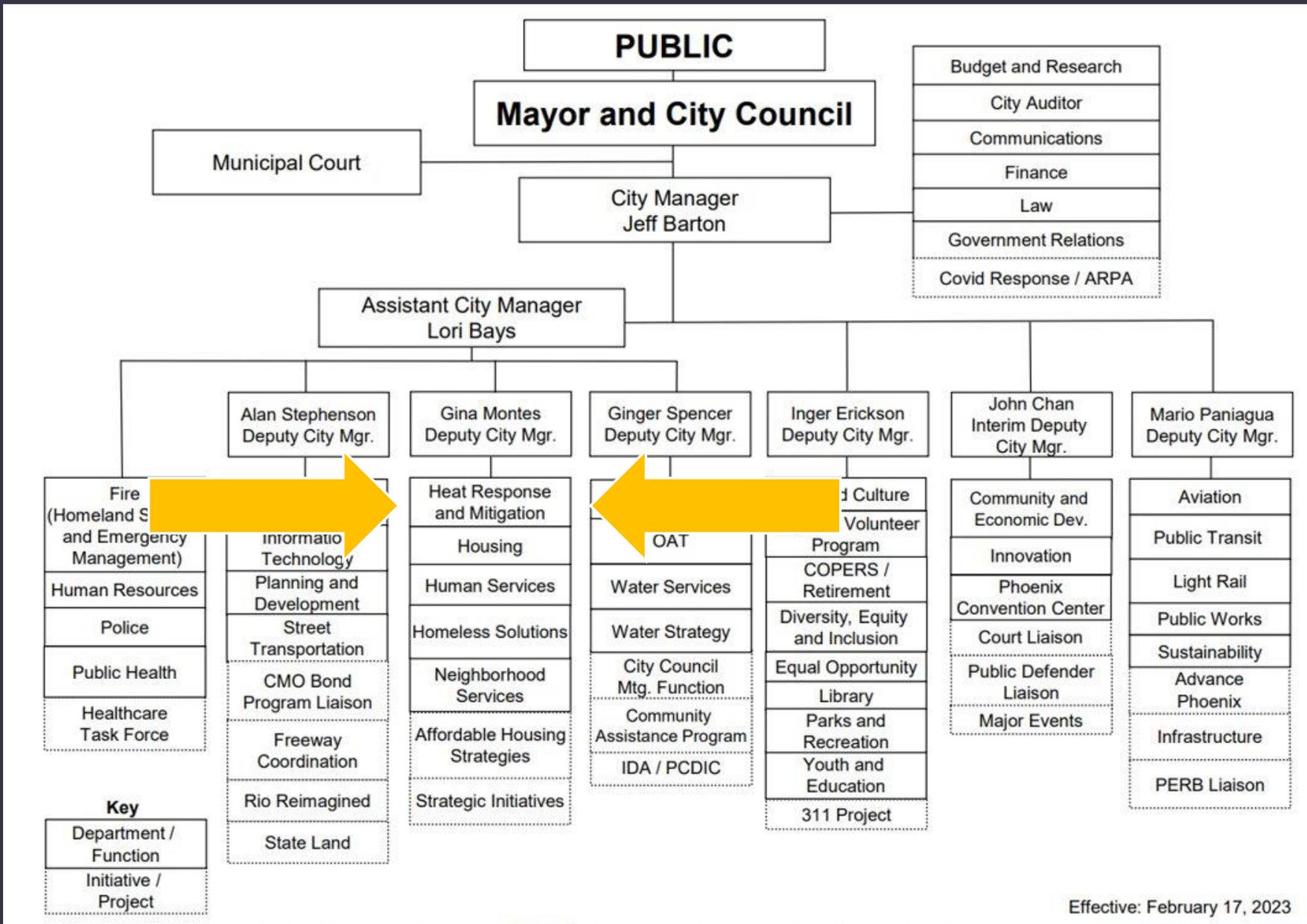
--- overhead electrical lines



0 100 feet







The new Office of Heat Response and Mitigation

- Director 

- Heat Response Program Manager
 - New Project Management Assistant ½ time



Response

- Urban Tree Program Manager
 - Tree Equity Project Coordinator
 - Built Environment Specialist
 - New Project Management Assistant ½ time



Mitigation

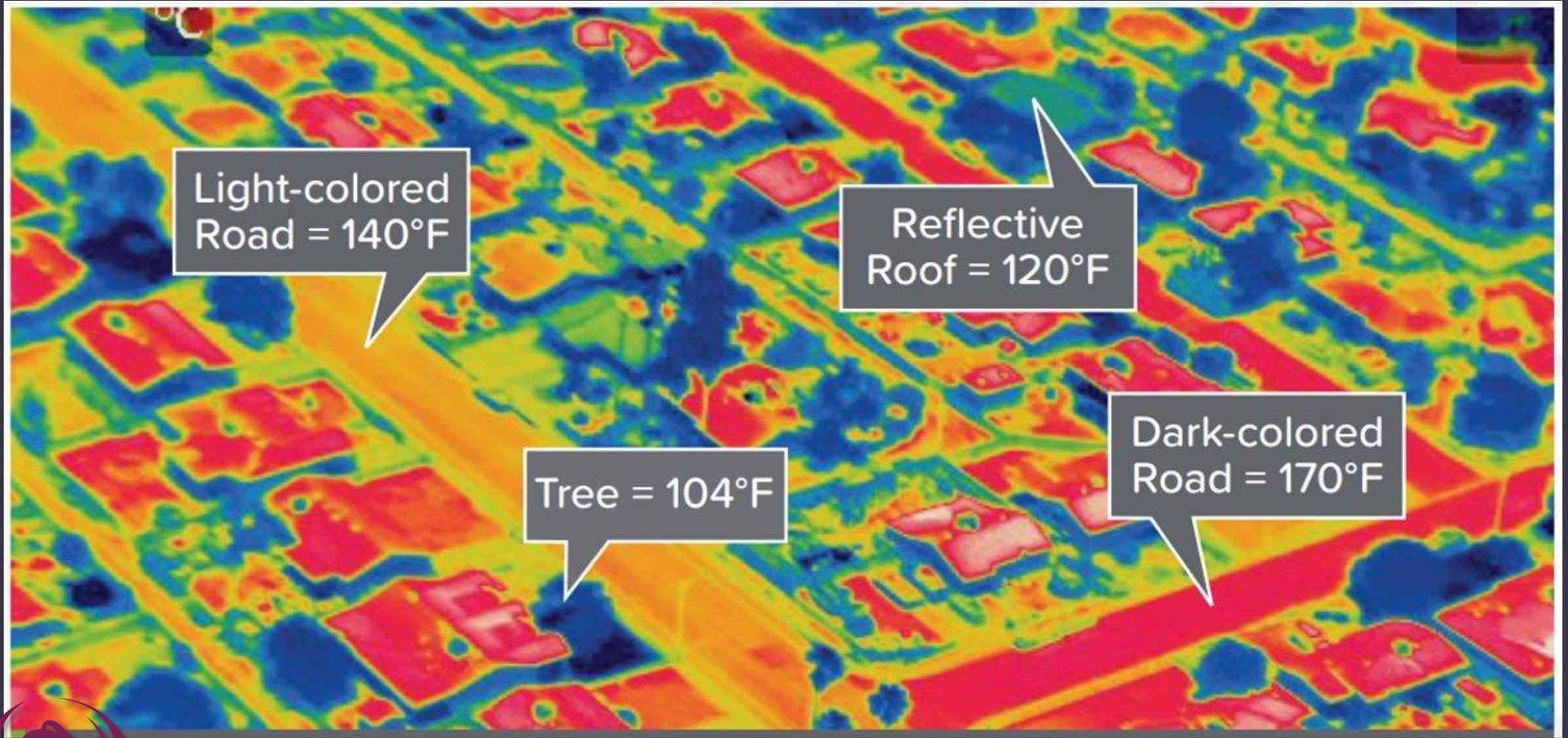


- Administrative Assistant



Phoenix Urban Heat Island Profile





Light-colored
Road = 140°F

Reflective
Roof = 120°F

Tree = 104°F

Dark-colored
Road = 170°F



Heat Metrics - Surface Temperatures + Thermal Comfort



- Taken from a forward looking infrared (FLIR) camera during the Urban Heat Island Mapping Campaign in Las Cruces, New Mexico on July 12, 2020, the right image shows heat. The left image shows a regular photograph for context. In the FLIR image, lighter or brighter colors indicate warmer areas, while darker areas are cooler. Photo Credit: Dr. Dave DuBois

- <https://www.climate.gov/news-features/features/climategov-tweet-chat-talk-heat-experts-mapping-urban-heat-islands>



Shade Reduces Air, Surface, and Radiant Temperatures



Radiant Temperature
(what we feel)

Air Temperature

Surface Temperature

In the Sun

145°F

110°F

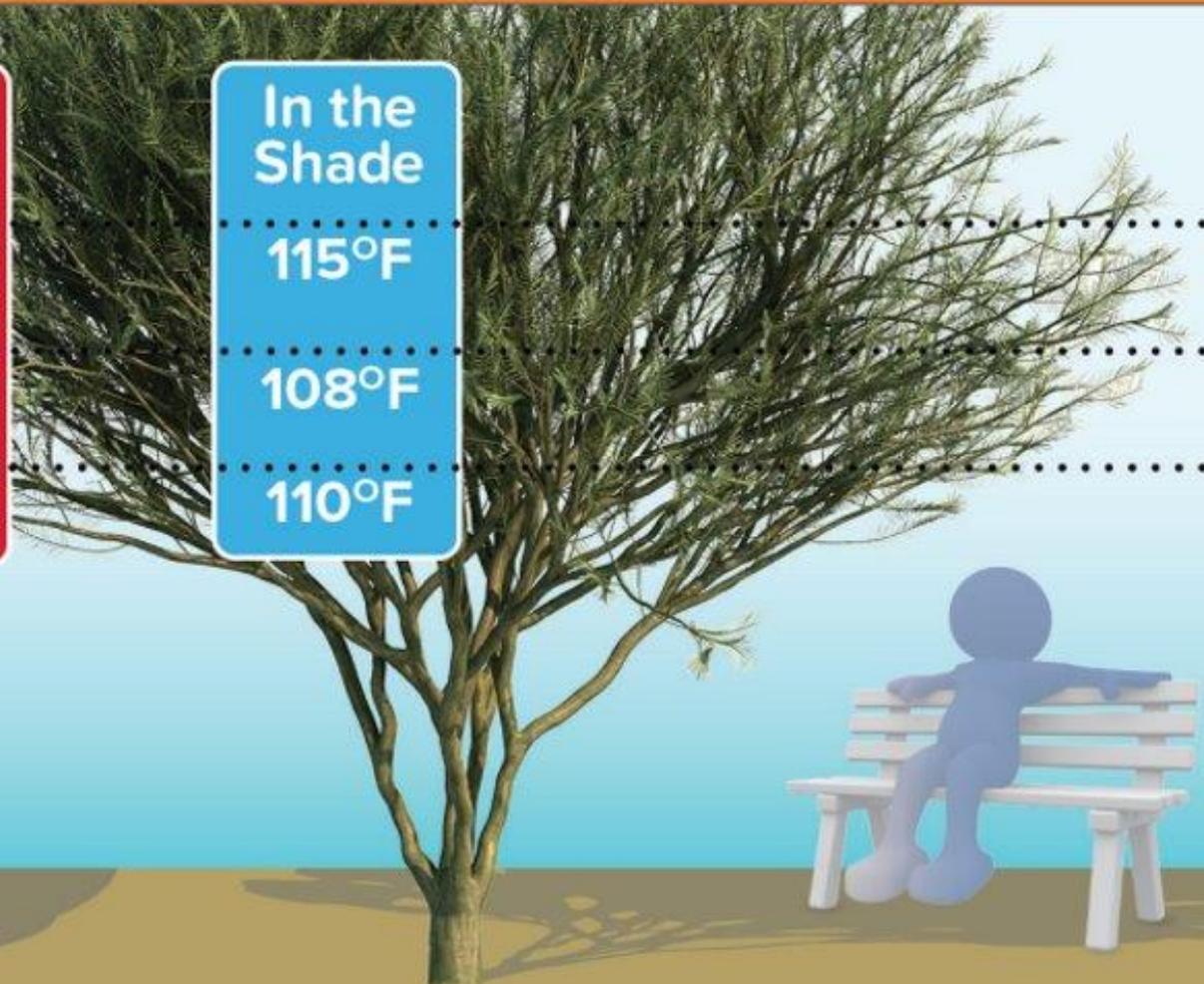
130°F

In the Shade

115°F

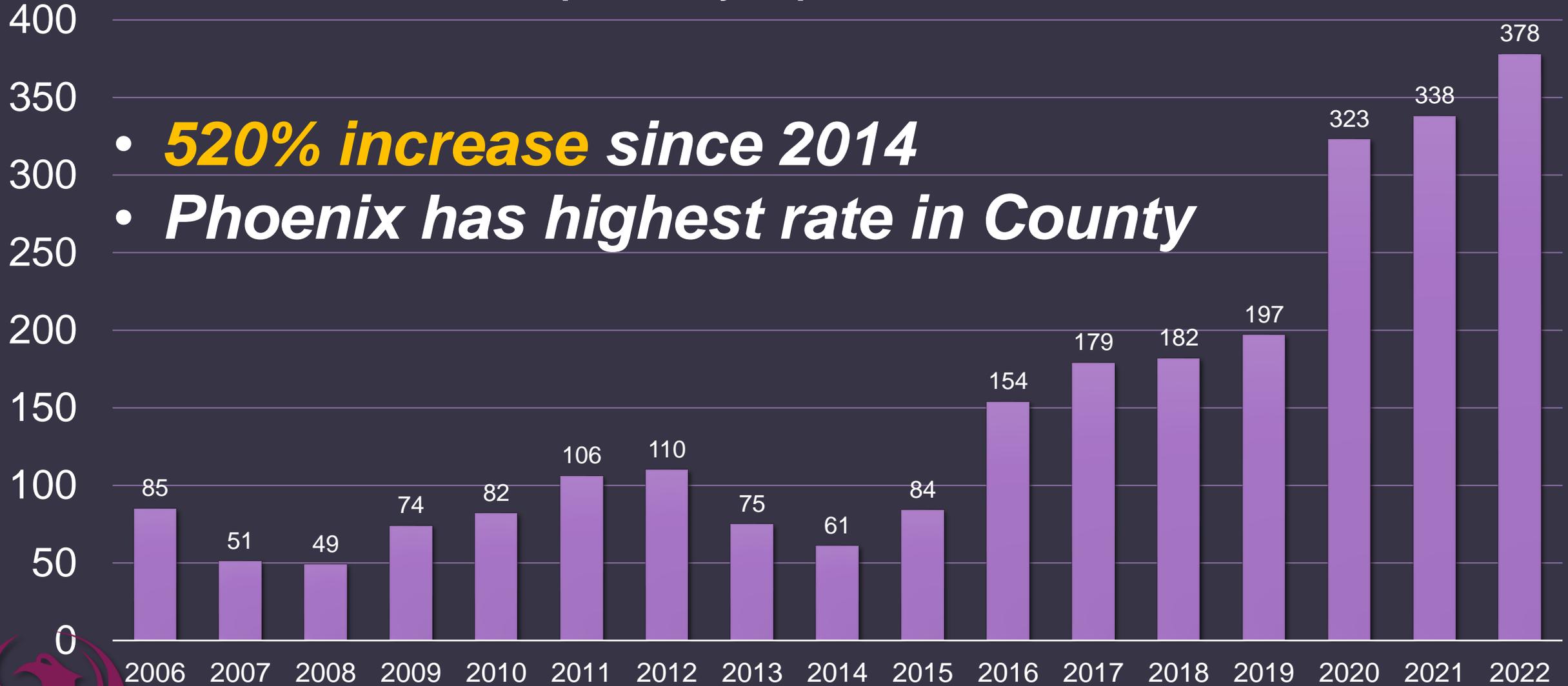
108°F

110°F



Heat-Associated Deaths in Maricopa County, Arizona

Source: Maricopa County Department of Public Health



How Blackouts during Heat Waves Amplify Mortality and Morbidity Risk, Journal: Environmental Science and Technology. May 2023



Phoenix residents seeking refuge from the heat in 2021. If enough trees were planted to shade half of the streets, deaths during dual crises would drop by 27 percent in Phoenix, the study said. Juan Arredondo for The New York Times

Study Results:

An estimated 789,600 people would require emergency department care for heat-related illnesses.

An estimated 12,800 people in Phoenix would die, the study said.

If enough trees were planted to shade half of the streets, deaths during dual crises would drop by 27 percent in Phoenix

The new analysis found that Phoenix, would experience immense loss of life and illness if a citywide blackout during a heat wave lasted for two days, with power gradually restored over the next three days.

<https://pubs.acs.org/doi/10.1021/acs.est.2c09588>

Vision for Office of Heat Response and Mitigation



- Respond to AND mitigate urban heat
- Understand and communicate costs and benefits
- Develop and apply meaningful metrics
- Innovate and evaluate our work
- Coordinate local and regional heat initiatives
- Partner with national and international institutions
- **Be responsive to community needs and guidance**
- **Advance heat equity**



Vision for Office of Heat Response and Mitigation



- Work locally and regionally with partners to achieve tree planting goals
- Coordinate COP departments' work to achieve tree planting goals
- **Update 2010 Tree and Shade Master Plan (Goal: Final Update April 2024)**
- **Spend \$4 million ARPA (American Rescue Plan Act) funds on Residential and School Tree Equity Accelerator Program by the end of December, 2024**



New Tree Canopy Data

First community-wide analysis of canopy cover change over time. (2014 vs. 2020)

Based on publicly available LIDAR (Light Detecting and Ranging) data, analyzed with internally created machine learning code, by Mary Wright in the Office of Heat

(Google, University of Vermont for American Forests, Earth Define and others all doing versions of this currently)



Gained Tree Canopy
Lost Tree Canopy

Central City Village

2014: 4.69% canopy
2020: 4.67% canopy

Gained tree canopy in
2.02% of village

Lost tree canopy in 2.04%
of village



Phoenix's Office of Heat Response and Mitigation (OHRM or HeatReadyPHX) is leading the efforts of the hottest large city in the United States to fight the growing hazard of urban heat. OHRM focuses on both heat response (helping people cope with hot weather) and heat mitigation (cooling the city and making it more comfortable).

During all seasons of the year, HeatReadyPHX coordinates programs and policies to help lower urban temperatures and protect public health. It also tracks trends, collects data, and collaborates with other governments and organizations to share ideas and solutions when it comes to dealing with heat.

Contact Us >

Resources >

Cooling Ordinance >

Mitigation:

Tree Donation Portal >

Phoenix's Urban Forest >

Response:

Cool Callers Outreach Sign-Up >

Volunteer with We're Cool >

Take a Hike Do it Right >

Emergency Utility Assistance >

Pools and Splashpads >

**Click to apply:
2023 Heat Relief
Grant**

HUMAN SERVICES



JUN 16, 2022
**City Takes Proactive Safety
Steps to Protect Residents as...**



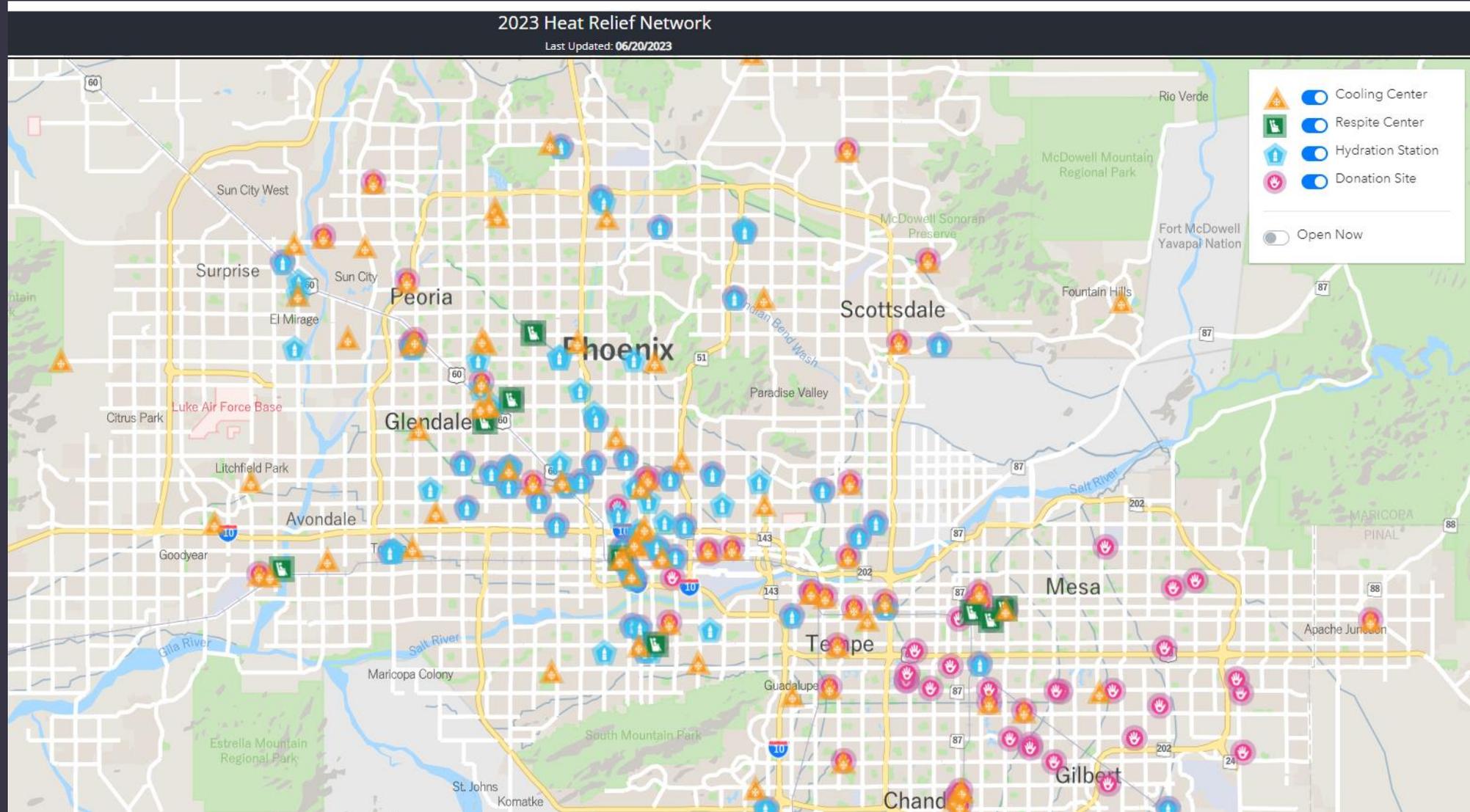
JUN 09, 2022
**Free Heat Relief Supplies
Available to Community...**



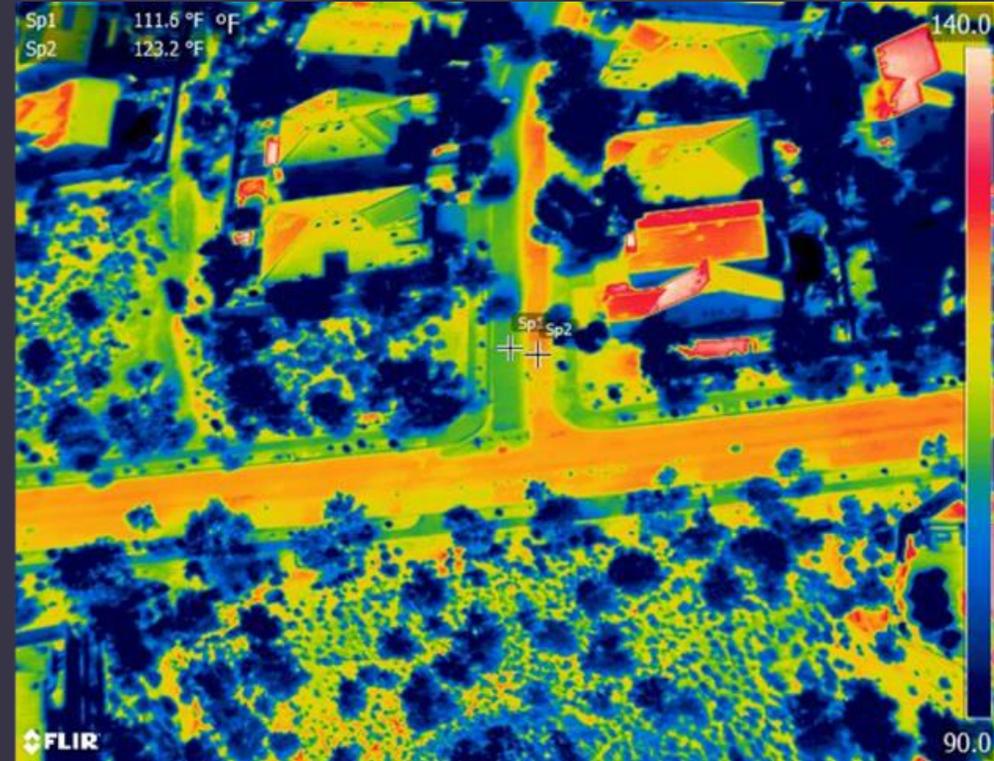
JAN 06, 2022
**Phoenix Receives Major
Donation for Urban Forest**



Publicly Accessible Cool Space <https://hrn.azmag.gov/>



Cool Pavement Program – Streets Dept.



Sept 10, 2020
12:45pm



Cool Pavement Program – Streets Dept.



City of Phoenix Urban Forestry Investments

Program Name (Lead Department)	Funding Amount	Trees Planted per Year	Funding Source	Focus Areas
Cool Corridors (Streets)	\$1,482,600 annually	1,800	General Fund	Pedestrian corridors along major arterials
Street Tree Replacement (Streets)	\$392,000 annually	780	Capital Improvement Program	Street landscape maintenance areas
Parks Tree Planting (Parks)	\$260,000 annually	1,500	Capital Improvement Program	City parks
Residential Tree Equity (OHRM)	\$6,000,000 one-time	~5,000 (through 2024)	American Rescue Plan Act	Neighborhoods, right of way, schools
Donations/Special Projects (OHRM)	Variable	Variable; ~500 in 2021-2022	Variable	Variable

\$1.5 Billion of funding for Urban Forestry in the Inflation Reduction Act. COP applied for \$38 million directly and partnered with ASU for additional funding for workforce development. Awards will be announced in October 2023



Current Tree Planting City of Phoenix



Cool Corridor (Streets Department)
Streets department will complete 200 miles of Cool Corridor by 2030.

A Cool Corridor has a goal of 60% tree canopy coverage (min 30%). One side of the street. Approx 100 trees/mile

1st Cool Corridor planting 4.16.2022 at Caesar Chavez Park paid by American Forests. 250 trees over 1/2 mile. Some trees were in park next to sidewalk.



= \$550/tree

Streets dept. estimate (low)



= \$1,110,000/year for 20 miles/2,000 trees

Recent Tree Projects – Collaboration and Proposals

- Awarded Tree City USA Award for 37th year
- Working with Valley Leadership Impact Team on commercial incentive program for tree planting
- Cofacilitating the Urban Tree Roundtable with American Forests and Arizona Sustainability Alliance
 - Created 2 working groups
 - Workforce Development and Municipality working group
 - Participating in 3rd: Tree Species working group
- Assisting Streets department in identifying future locations for Cool Corridors
- Facilitated tree related community engagement module in partnership with the Office of Sustainability and Resilient Cities Collaborative and Unlimited Potential
- Inflation Reduction Act – Urban Forestry Grant proposals submitted June 1
 - Collaborated with ASU and other cities and organizations on large workforce development proposal
 - Requested \$38 million for neighborhood and tree planting grant programs and a Community Tree Steward Program, through the Inflation Act Funding NOFO.



Recent Office of Heat Tree Projects – Grant Park Tree Giveaway

- Funded by grant from Phoenix IDA
- Location at Grant Park Community Garden
- 30 trees given away, Spring 2023
- Pilot to test "Neighborhood Tree Give Away" method
 - Assessed: what went well, what could be improved
 - Not our preferred method of community planting



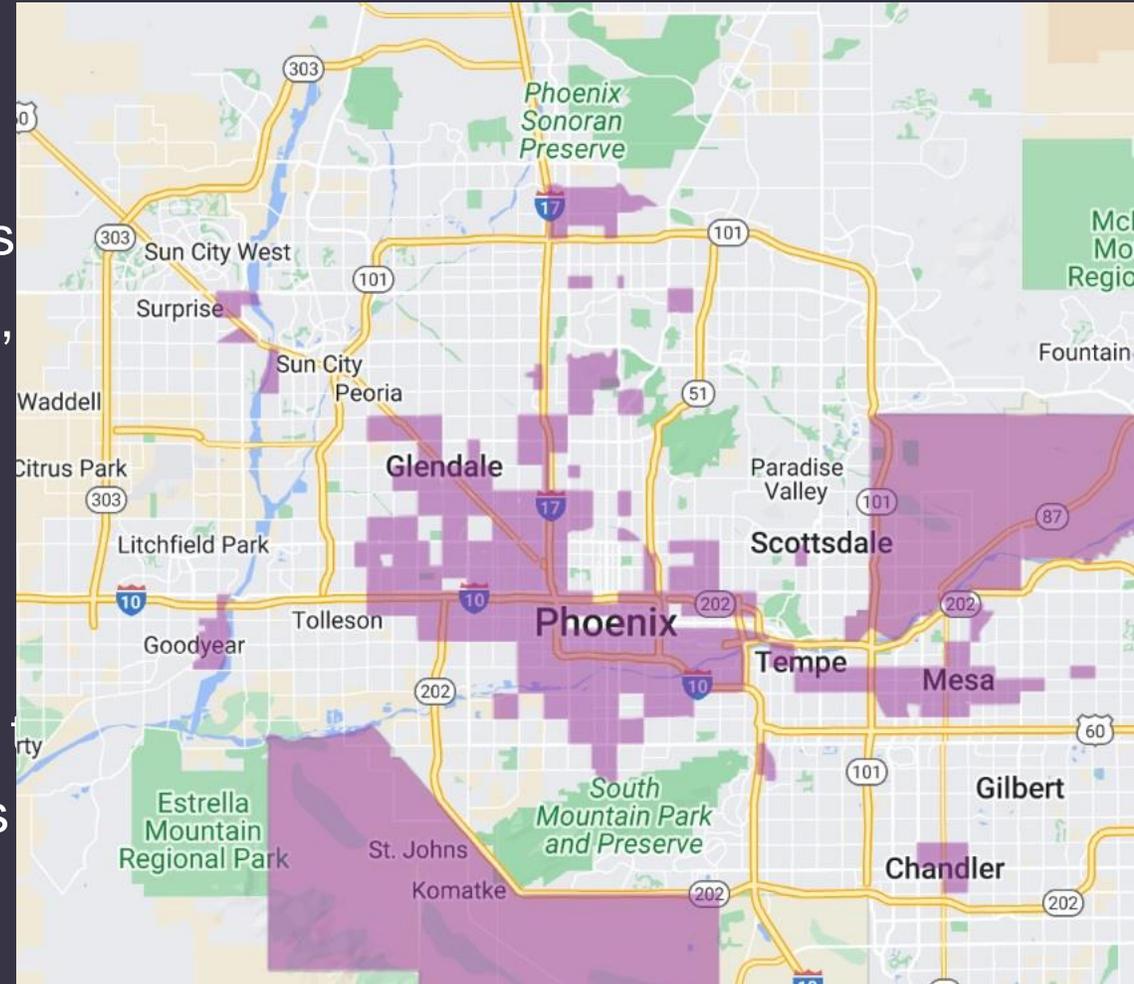
Recent Office of Heat Tree Projects – Brentwood Neighborhood

- Funded by grant from Phoenix IDA
- Location, public space in neighborhood
- 114 trees planted, Spring 2023
- Pilot to test "Neighborhood Tree Planting" method
 - Assessed what worked well, what could be improved
 - Our preferred method of community planting



ARPA Tree and Shade Grant Programs

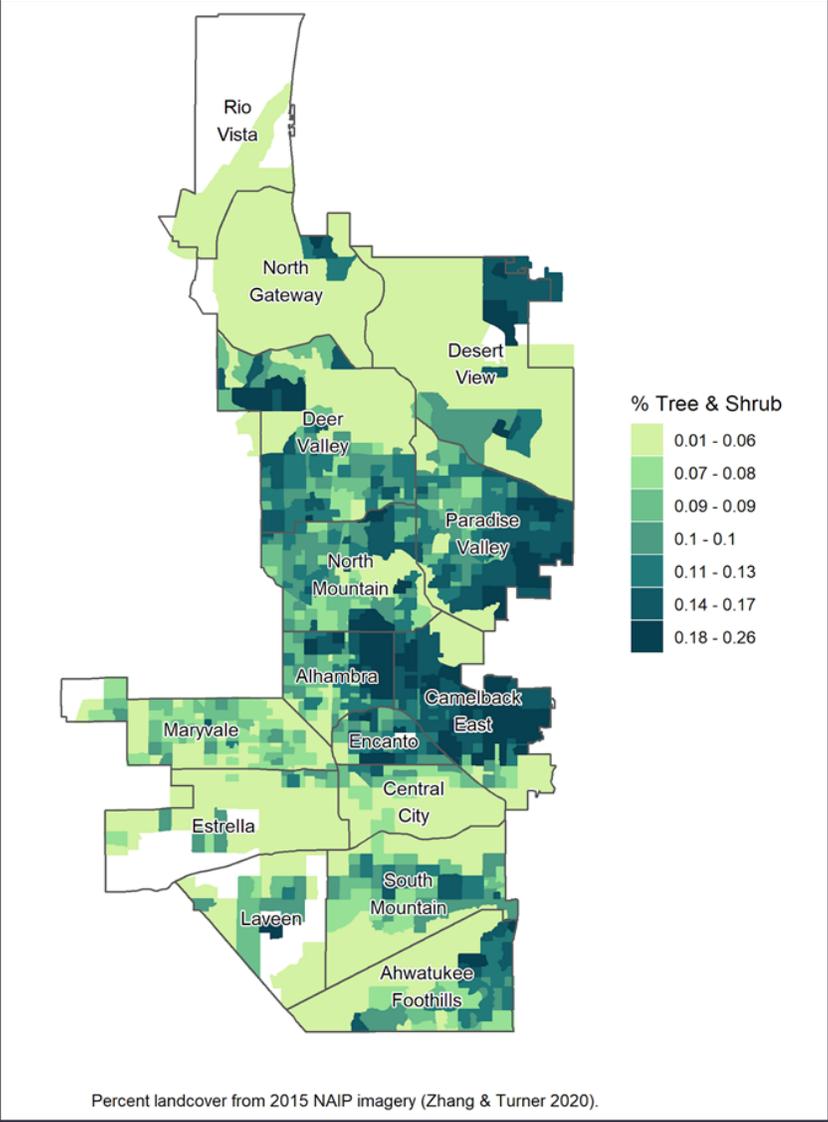
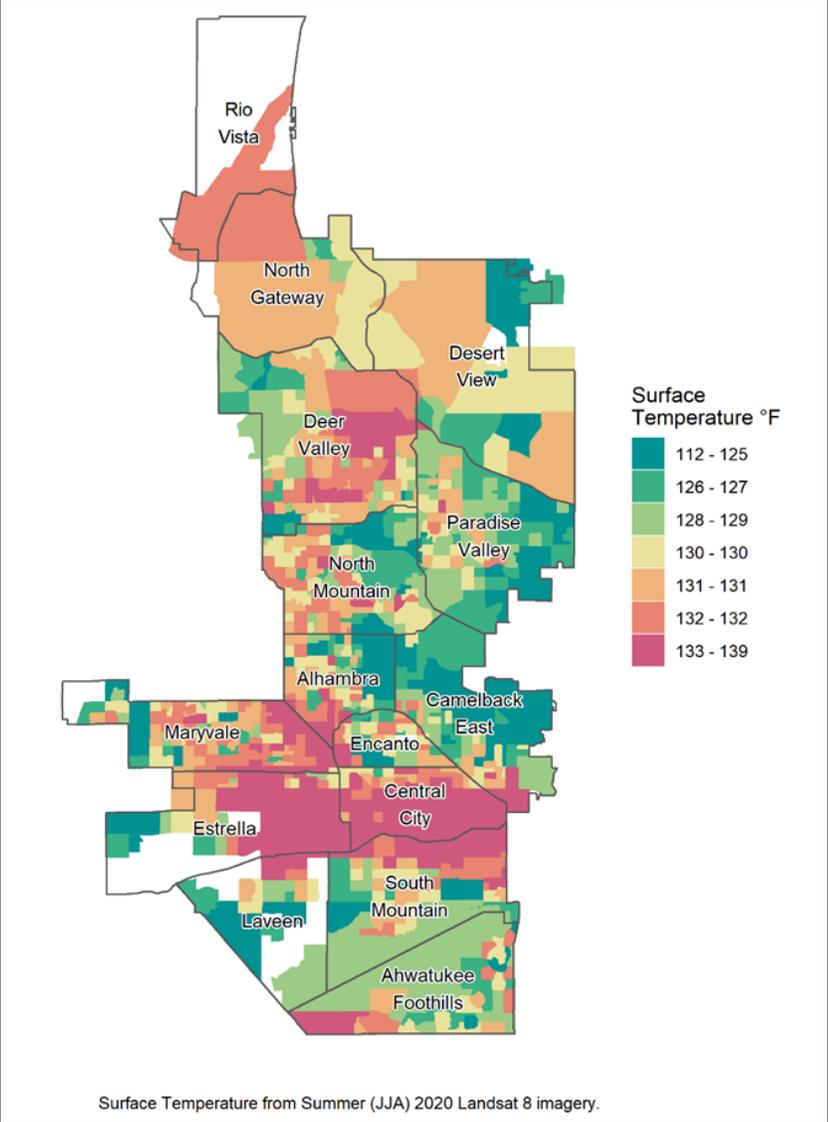
- Goal is to open ARPA grants this summer
 - Canopy for Kids
 - Around \$2 million to provide funding and supplies for tree planting projects to public school districts, non-profit schools, and non-profits with 501(c)(3) status in Qualified Census Tracts
 - Community Canopy
 - Around \$2 million to provide funding, supplies, services, and education for tree planting projects for community members, neighborhood associations and non-profits in Qualified Census Tracts



Map of Qualified Census Tracts
https://www.huduser.gov/portal/sadda/sadda_qct.html



Heat Metrics - Surface Temperatures- City of Phoenix



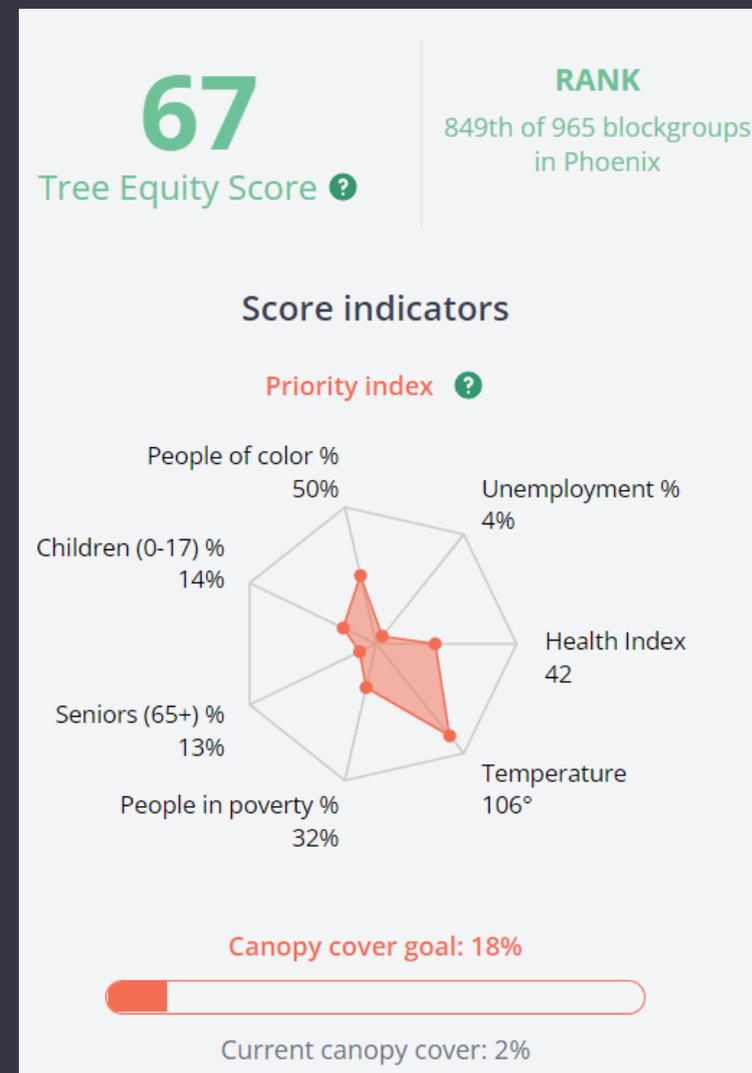
Tree Equity Metrics

Phoenix has committed to achieving **tree equity**

- 421 of 965 Phoenix census block groups have tree equity scores below 80 (current median score in Phoenix)

- 460,000 trees are needed to raise the citywide minimum to 80

Tree equity score from American Forests Tree Equity Mapping Tool



Tree Equity Metrics

Treeequityscore.org/map

MENU ▾

AZ Congressional District 7

Census Block Group 40131168002

67

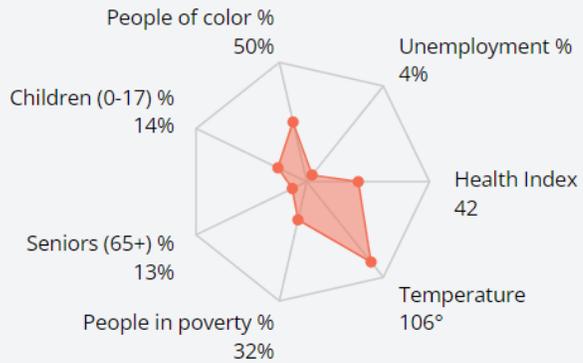
Tree Equity Score

RANK

849th of 965 blockgroups
in Phoenix

Score indicators

Priority index



Canopy cover goal: 18%



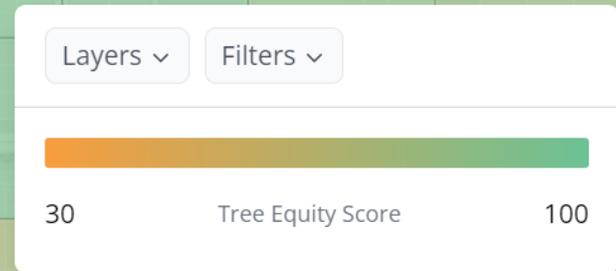
Current canopy cover: 2%



67

Tree Equity Score

Click to explore



© Mapbox © OpenStreetMap Improve this map



Current Tree Planting and Tree Related Code

Basic Landscape Code (applies to new projects only)

- a. Minimum caliper: two inches.
- b. Trees in the right-of-way should be placed 25 feet on center or equivalent grouping.
- d. At installation a minimum 30 percent of all trees shall have a minimum caliper of three inches.
- e. Fifty percent living vegetation ground coverage should be provided when a landscape strip is present or required as part of redevelopment.

Walkable Urban Code (WU)

The code will regulate development around light rail stations in all five Transit-Oriented Districts (TOD): Gateway, Eastlake-Garfield, Midtown, Uptown, and Solano. The standards are already part of the Interim Transit Oriented Overlay Districts

- a. Minimum 50% 2-inch caliper and 50% 3-inch caliper spaced 20-feet on center
- b. Minimum 75% of the sidewalk should be shaded (can be structural or landscaping).

Current Tree Planting and Tree Related Code

Landscape, Inventory, and Salvage Code (new projects)

Plant inventory should include the scope of work plus 10' beyond

Plants that are eligible for Inventory and Salvage include:

- a. Native Plants: All trees four inches (4") in caliper and larger
- b. All cacti three feet (3') and taller
- c. Non-Native Plants: All trees four inches (4") in caliper

These plants must remain in place, or be salvaged, held on site and re-planted back in the project.



Urban Forestry Return on Investment



© Ivan Martinez

▪What does a tree cost?

- *Proposed:* an urban tree costs at least \$1,200 for planting, irrigation, cost of tree, 5 years maintenance.
- This is a big shift in the mind of the general public.

3.78 Benefit-Cost Ratio (TNC 2021)

- Improved public health
- Increased labor productivity
- Longer infrastructure life cycle
- Energy savings



Tree and Shade Plan Update

- Assessment of 2010 plan
 - One Vision: Achieve an average 25% canopy coverage in Phoenix
 - 3 Sections with Goals
 - 65 Action Items

Achieving the Vision



Section 1
Raise Awareness (Educate)

A / Recommendations

B / Policy



Section 2
Preserve, Protect and Increase

A / Recommendations

B / Policy



Section 3
Sustainable and Maintainable Infrastructure

A / Recommendations

B / Policy

#	Action Description	Lead Dept.	Time Frame
A.1.	Create a council-approved Citizen Tree and Shade Committee to oversee Urban Forest issues*	PRD	Mid
A.2.	Provide information to the public about on-going efforts and long-term strategies*	PRD	Short
A.2.a	Update Urban Forest Website	PRD	Short
A.2.b	Make presentation to Village Planning Committees	PRD/PLN	Short
A.2.c	Send out information via Water Notes bill insert	PRD/WSD	Short
A.2.d	Present information at conferences	PRD	Short
A.2.f	Present information to community groups and organizations	UFIT	Short
A.3.	Develop and Establish Education and Outreach Programs	PRD/WSD	Ongoing
A.3.a	The Value of the Urban Forest	PRD/WSD	Mid
A.3.b	Landscaping in the Southwest	PRD/WSD	Mid
A.3.c	Creating Sustainable Landscapes	PRD/WSD	Mid
A.3.e	How to Maintain an Efficient Irrigation System	PRD/WSD	Mid
A.4.	Create Channel 11 Programs, Streaming Web Videos and DVDs	PRD	Ongoing
A.4.a	What is an Urban Forest?	PRD	Short
A.4.b	How to Plant Trees	PRD	Short
A.4.c	How to Maintain Trees	PRD	Short
A.4.d	How to Create a Sustainable Landscape	PRD/WSD	Short
A.4.f	Irrigation 101	PRD/WSD	Short
A.5.	Hold Urban Forest and Shade Symposium	UFIT	Short
A.6.	Develop Shade and Urban Forest Excellence Award	UFIT	Mid
A.7.	Research grant opportunities	PRD	Ongoing
A.8.	Develop and Maintain Partnerships	UFIT	Ongoing
A.9.	Research and Complete Shade Demonstration Projects	PRD/ARTS	Short



Tree and Shade Plan Update

- Assessing 2010 TSMP – Internally
 - Asked for general Comments about 2010 TSMP

City Clerk Department: "We would suggest that there be more meetings and information sharing regarding this program. The idea is great, but there is not much collaboration on how to attain these goals as an entire city. "

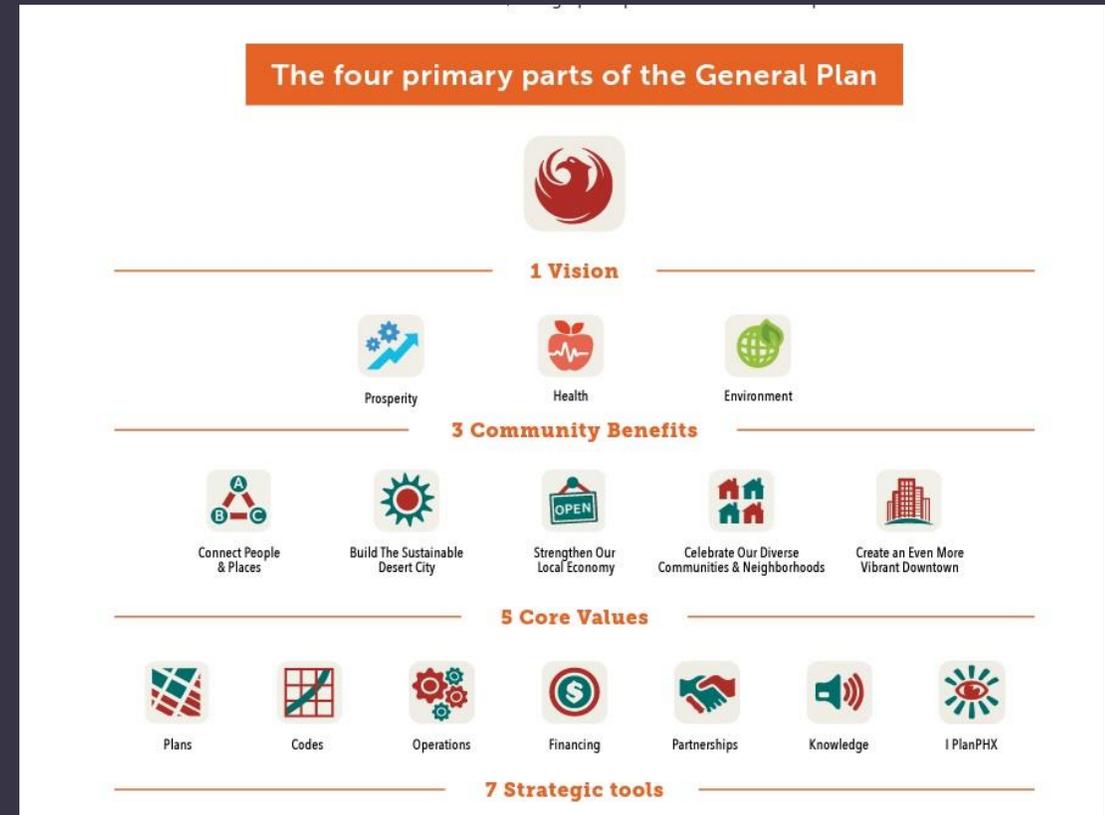
Fire: "For our role moving forward, we look forward to being a good partner and supporting this program. The Fire Department currently only uses desert landscaping and native trees in our new fire stations and buildings. I would love to be able to add additional trees and shade to our stations moving forward and partnering to provide a standard approach to our new properties as they are being built."

Arts and Culture "Support finding ways to provide artists a seat at the table. Projects don't have to be physical structures, artists can also implement creative community engagement strategies and other interactive initiatives that support broader efforts in the plan"



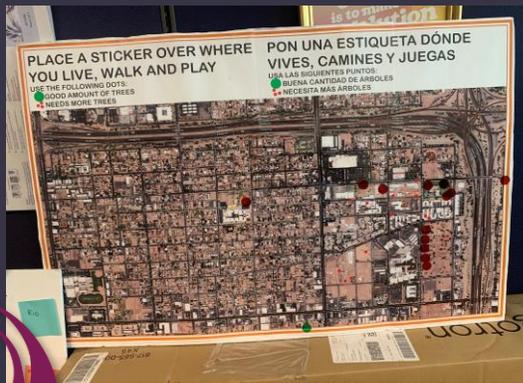
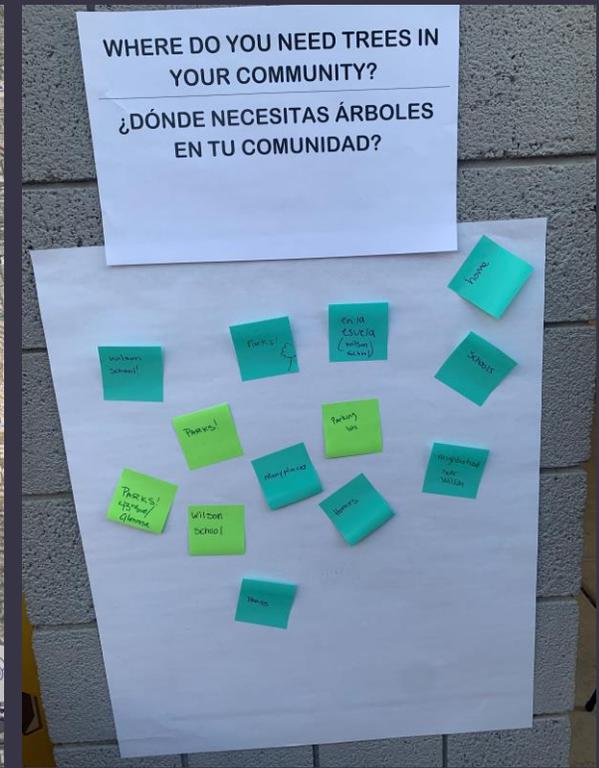
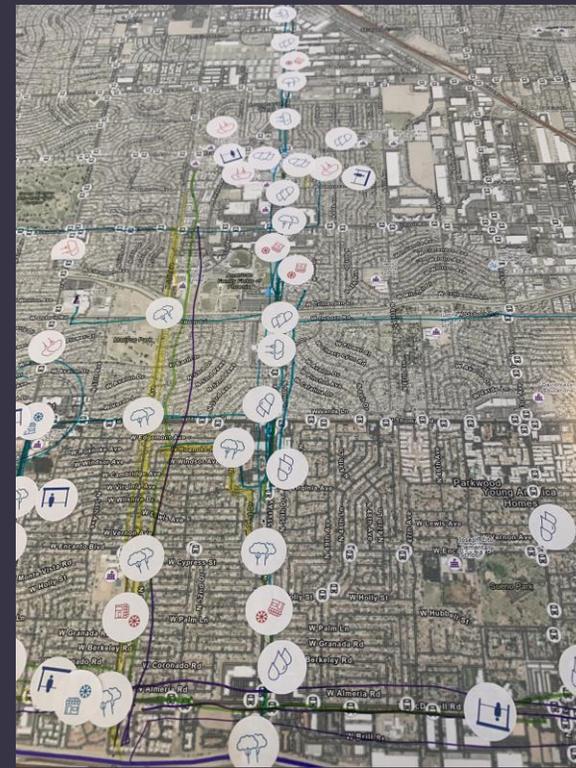
Tree and Shade Plan Update

- Internally Collecting ideas for update by meeting 1:1 with staff from City of Phoenix departments
- Alignment with other plans/initiatives
 - General Plan, Climate Plan
 - Water, Air quality, Biodiversity



Tree and Shade Plan Update

- Community Engagement (just a start)
 - Neighborhood presentations
 - Charrettes with Resilient Cities Collaborative/Office of Sustainability and Unlimited potential (Maryvale and South Phoenix)
 - Spring Community Fairs
 - Edison Eastlake Community Connections Fair
 - Wilson Elementary Health Fair
 - Harmon Park Community Fair



Wilson Elementary Health Fair
 "Schools"
 "Neighborhood near Wilson School"
 "Parks"
 "Park at 43rd Ave/Glenrosa"
 "Homes"



Questions we are working on

- Revisiting Big Goal for the Tree and Shade Master Plan update?
 - Quantitative?
 - Average 25% Tree and Shade Coverage?
 - A million trees, two million trees, three million trees+?
 - All neighborhoods will have 50% shade canopy in public space?
 - Qualitative and Aspirational?
 - Phoenix will be cooler in 10 years than it is today?
 - We will have the most sustainable urban forest in the world?
- Are there new goals, more specific goals? Equity based goals?
- Water/Drought vs. using more water for trees. How do we balance?
- Green Infrastructure, what role can this play?
- What role can landscape architects play in the urban forestry movement?

Contact Information



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Thank you!

