

Urban Forests and Heat Island Mitigation

North Central Texas Council of Governments

June 2, 2022



North Central Texas
Council of Governments
Environment & Development



CENTER of
DEVELOPMENT EXCELLENCE
for the future of North Central Texas



WELCOME AND INTRODUCTIONS

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WELCOME AND INTRODUCTIONS

Speakers

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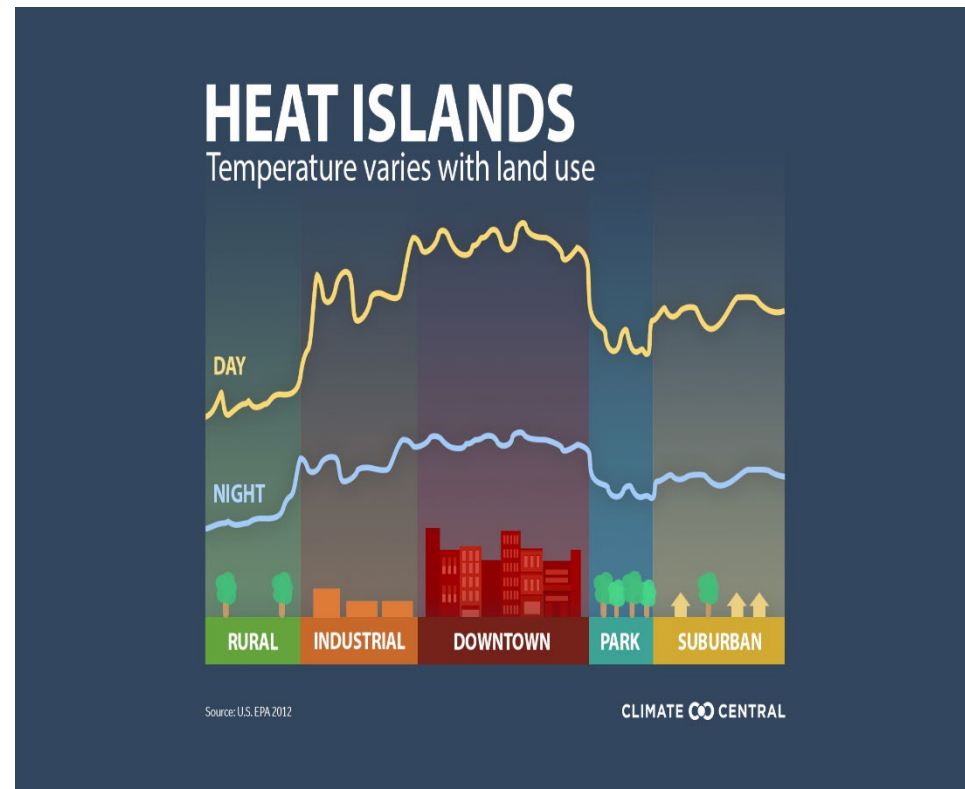
Using Urban and Community Forests to Mitigate the Impacts of Urban Heat Island

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What is Urban Heat Island?

- ▶ A micro-climate at the urban scale where urban temperatures are much higher than their outlying areas.
- ▶ Urban areas are on average 7.2 degrees warmer than the rural areas during the day. (US Global Climate Change Research Program 2017)
- ▶ Hot spots within urban areas can experience temps 15-20 degrees warmer than surrounding areas. (Climate Central 2021)



Factors for Urban Heat Island

1. Albedo
2. Percentage of Greenspace
3. Population Density
4. Building Height
5. Average Width of Streets
6. Irregularity of the City

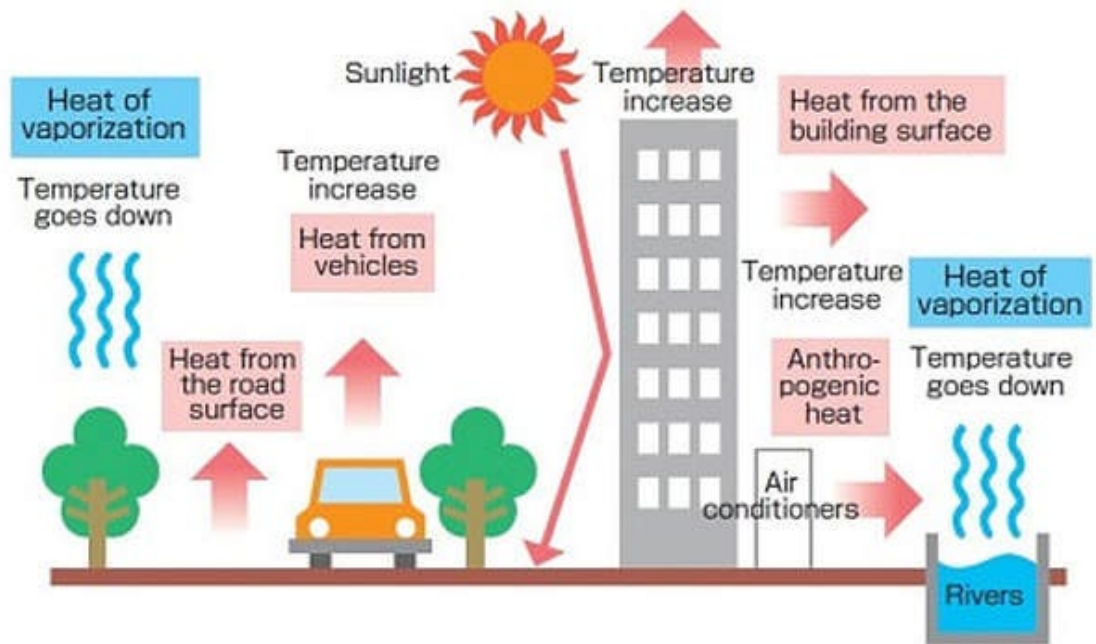
Albedo Score of Asphalt is considered .05

Albedo score of Greenspaces ranges from .70-.85

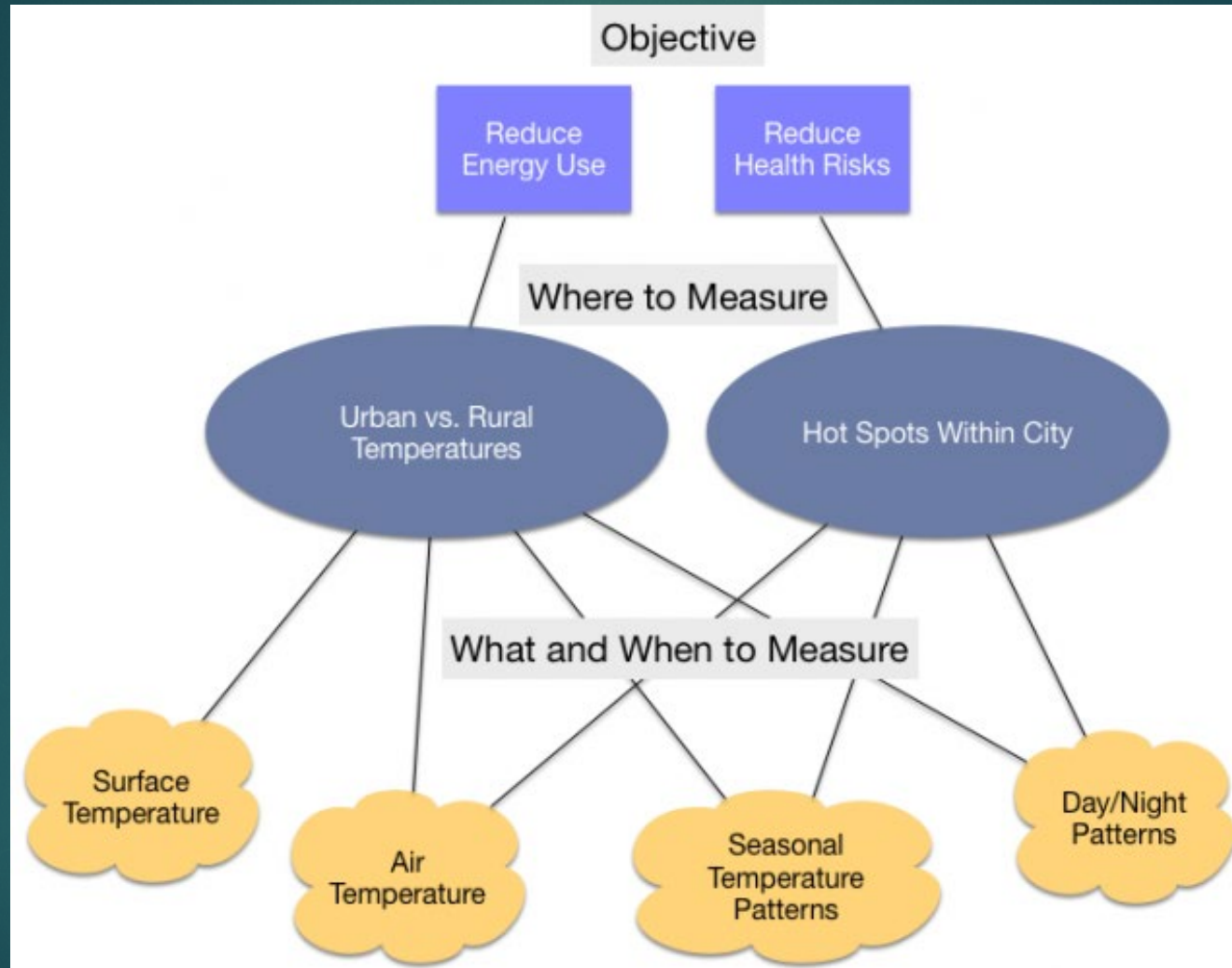
Measuring UHI – Contributing Heat Factors

- ▶ Short wave radiation from the sun
- ▶ Long wave radiation from stored heat in urban structures. (Buildings asphalt etc)
- ▶ Anthropogenic heat waste

● How the Heat Island Phenomenon occurs



How do we determine UHI –What are you measuring For?



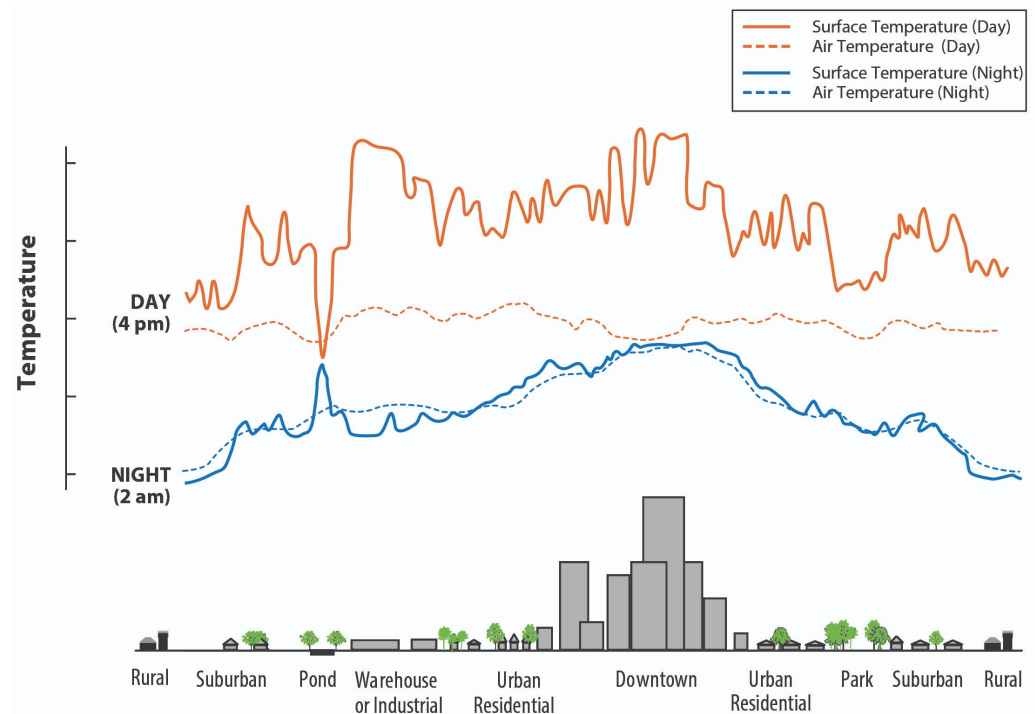
How do we determine UHI –Surface Temperature Vs Air Temperature

- ▶ Air Temperature – Most common temperature readings. Standard weather stations and other monitoring instruments typically used for air temp readings.
- ▶ Surface Temperature-Heat energy given off by the land, buildings, and other surfaces. Technologies that measure temperatures of surfaces, such as instruments mounted on satellites and airplanes.
- ▶ Overall, will want a combination for best results.



How do we determine UHI – Important Factors to include as well

- ▶ Greatest discrepancy of temperature for UHI and surrounding communities is generally at night and in the winter.
- ▶ Urban structures are holding that heat during the day, cities are unable to cool off at night.



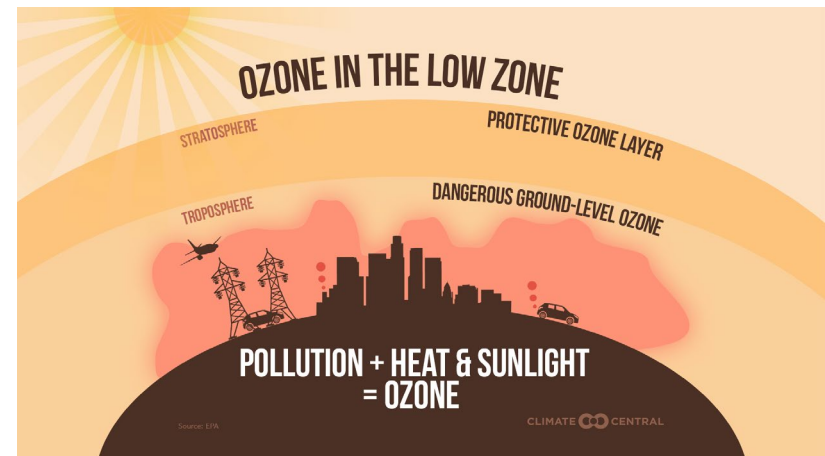
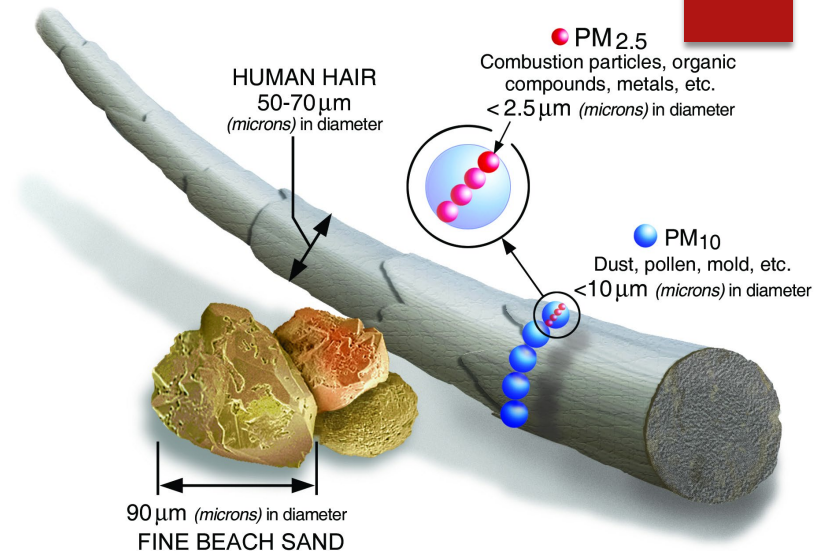
Danger of UHI - Energy Consumption

- ▶ Urban heat is really the nexus of potential issues within an urban environment. It truly is a trickle-down effect that touches everything.
- ▶ Electricity demand for a/c increased up to 9% for every 2 degree increase in temperature. (Santamouris, M. 2020)
- ▶ If demand outpaces the power supply, city officials may have to use brownouts or even blackouts to prevent the system from overloading.



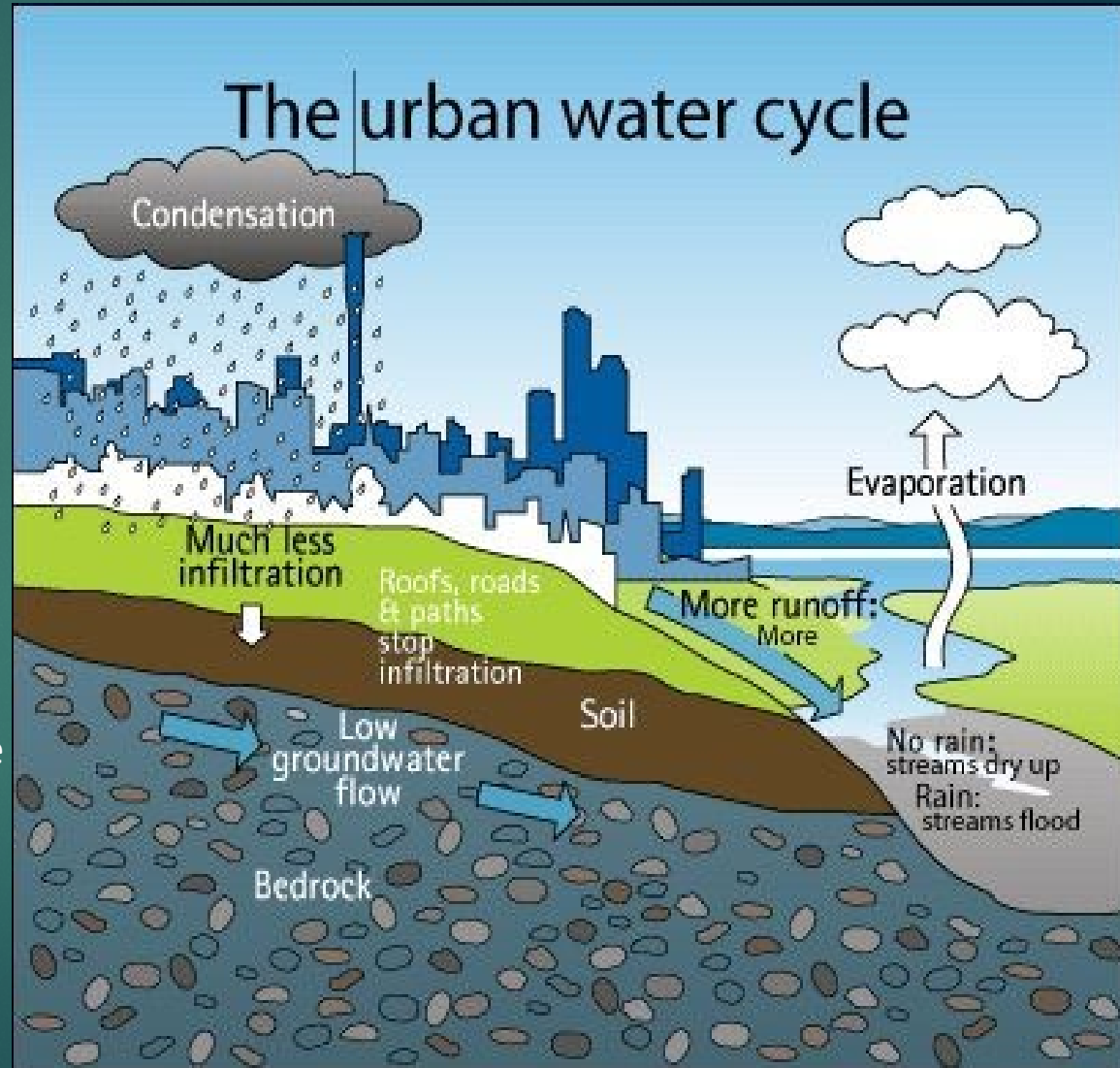
Danger of UHI - Air Pollution

- ▶ Increase in energy consumption has a direct relationship to increasing air pollutants and greenhouse gas emissions.
- ▶ Formation of ground-level ozone, fine particulate matter, and even acid rain.
- ▶ Contributes to global climate change.
- ▶ We can expect to increase as temperatures continue to rise.



Danger of UHI - Water Quality

- ▶ High temperatures of pavement and rooftop surfaces can heat up stormwater runoff, which drains unfiltered into storm sewers and raises water temperatures.
- ▶ Urban streams are hotter on average than streams in forested areas and rose over 7°F during small storms due to heated runoff from urban materials. (Somers, K.A., E.S. Bernhardt, B.L. McGlynn, and D.L. Urban. 2016)
- ▶ Water temperature affects all aspects of aquatic life, especially the metabolism and reproduction of many aquatic species.



Danger of UHI to Human Health

- ▶ Compounding factors all contribute to heat-related deaths and illnesses.
- ▶ Heat islands can also exacerbate the impact of naturally occurring heat wave Sensitive populations are particularly at risk during these events.
- ▶ At Risk Groups Include:
 - Older adult populations
 - Young children
 - Historically redlined and under-resourced communities
 - People who spend their working hours outdoors
 - People with preexisting health conditions.

KNOW THE DIFFERENCE!

| HEAT EXHAUSTION | OR | 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
• Sip water if fully conscious
• Take a cool shower or use cold compresses
• Lie down, loosen clothing

UHI in Texas and Dallas

- ▶ 11 Texas communities fall within the top 49 of Climate Central's intensity scores.
- ▶ Houston was 5th in the country.
- ▶ the DFW came in 27th with a 6.51 intensity score.
- ▶ Average intensity score of 6.1.
- ▶ (Climate Central report, 2021)

DALLAS • FT. WORTH HEAT ISLAND

FACTORS:

ALBEDO

GREENSPACE

POPULATION DENSITY

BUILDING HEIGHT

INTENSITY SCORE

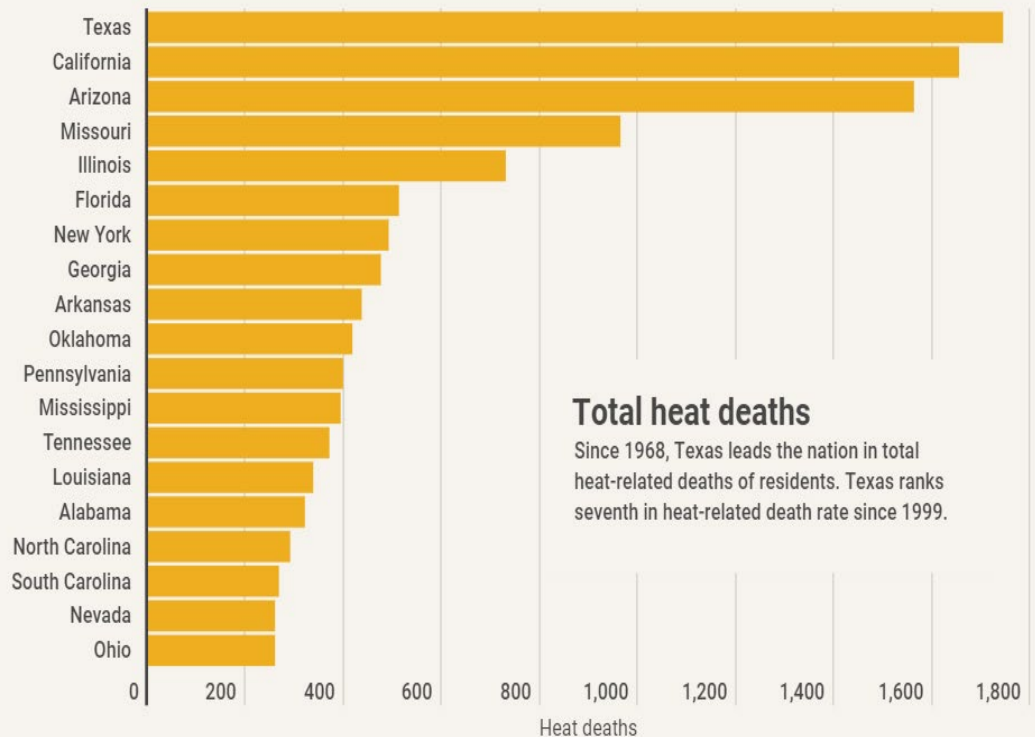
6.5°

Source: Climate Central analysis based on Sangiorgio (2020) DOI: 10.1038/s41598-020-75018-4 and Demuzere (2020) DOI: 10.1038/s41597-020-00605-z

CLIMATE  CENTRAL

Texas Heat Statistics

- ▶ Texas leads the country in Summertime electricity disconnections, heat-related work deaths, and infant and toddler deaths in hot cars. (CDC)
- ▶ Since 1968 Texas leads the nation in heat related deaths. (CDC)
- ▶ Since 1999, about 70 people per year have died of heat-related causes in Texas, second only to Arizona. (CDC)



Source: Centers for Disease Control and Prevention

JENNIFER F.A. BORRESEN/GATEHOUSE MEDIA

How trees help to mitigate these impacts -Shading

- ▶ Shaded areas are protected from direct sunlight, which can reduce temperatures between 20-45°F relative to peak temperatures in unshaded areas Akbari, (Kurn, et al. 1997).
- ▶ A study found that cars parked in a shaded parking lot in the summer had interior air temperatures that were 45°F cooler than cars parked in direct sunlight. (Scott, K., J. Simpson, E. McPherson. 1999)
- ▶ Something as simple trees shading a west-facing from direct sunlight can reduce the heat transferred into the house and indoor temperatures up to 36°F in the summer. (Sandifer, S. and B. Givoni. 2002).



How trees help to mitigate these impacts- Evapotranspiration

- ▶ Combination of Evaporation and Transpiration
- ▶ Process by which plants absorb water through their roots and release it as vapor through their leaves.
- ▶ Both of these liquid-to-gas processes use heat from the surroundings and cool the air.
- ▶ Trees can transpire 100 gallons of water every day, which has the same cooling effect as 5 standard air-conditioning machines running for 20 hours (EPA 1992.)



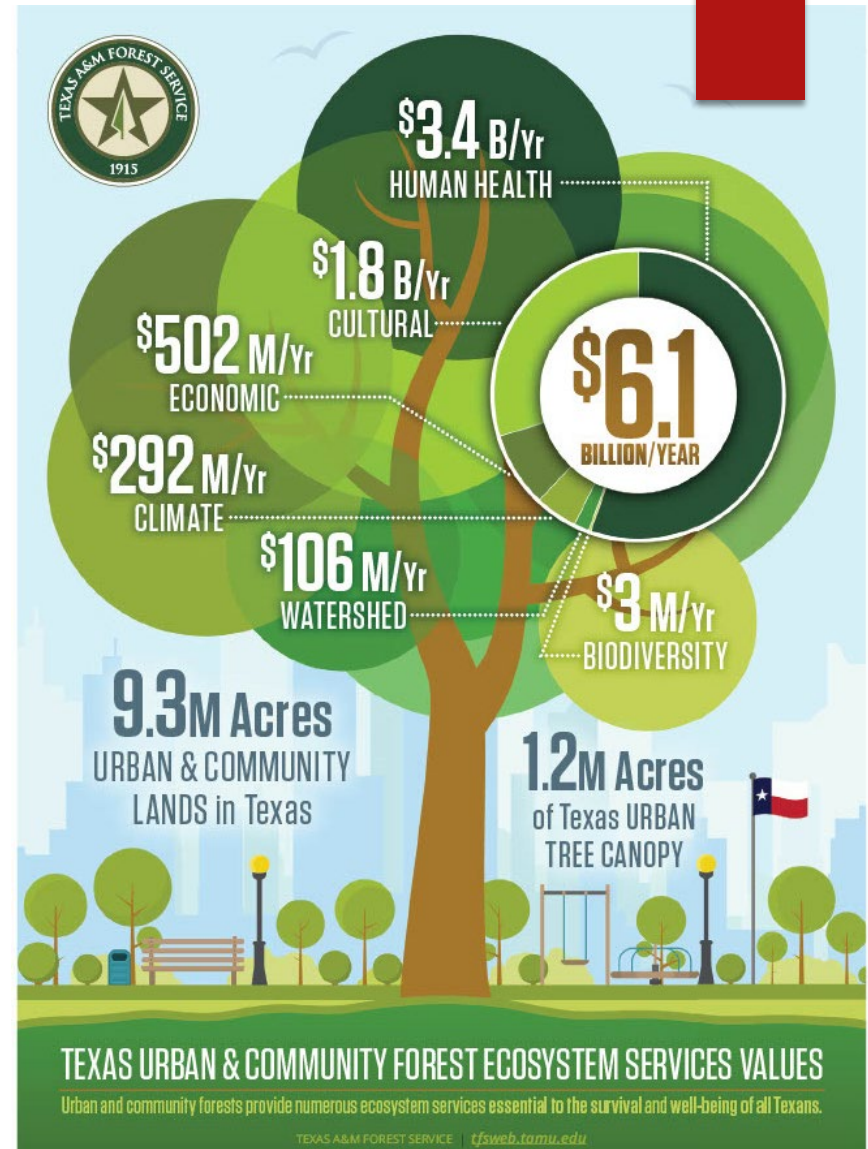
How trees help to mitigate these impacts- Wind and Air Circulation

- ▶ Larger expanses of trees such as urban forests and parks can help increase local air circulation. (Spronken-Smith RA and Oke TR. 1999)
- ▶ Trees also can act as sinks for other harmful pollutants.
- ▶ Trees are effective air filters by design, filtering out not only gasses that are harmful to humans, but also harmful to the earth's ecosystems.



Tree Benefit Breakdown

- ▶ Stormwater Reduction
- ▶ Water Quality Improvement
- ▶ Energy Savings
- ▶ Human Health Benefits
- ▶ Air Quality
- ▶ Aesthetics
- ▶ Property Values



Healthy Trees Healthy Lives

- ▶ Texas A&M Forest Service's Urban and Community Forestry Program fosters relationships with local governments and health care providers to spread the word of Healthy Trees Healthy Lives.
- ▶ Trees have positive impacts on a variety of human health disciplines providing physical, mental, immune system defense, pain tolerance and financial benefits.
- ▶ We can analyze the spatial distribution of the tree canopies relative to healthcare facilities, schools, parks, and residential neighborhoods within communities.



COMMUNITY FORESTRY PROGRAM

"Helping communities develop sustainable programs that provide Texans with healthy trees and forests."

College Station



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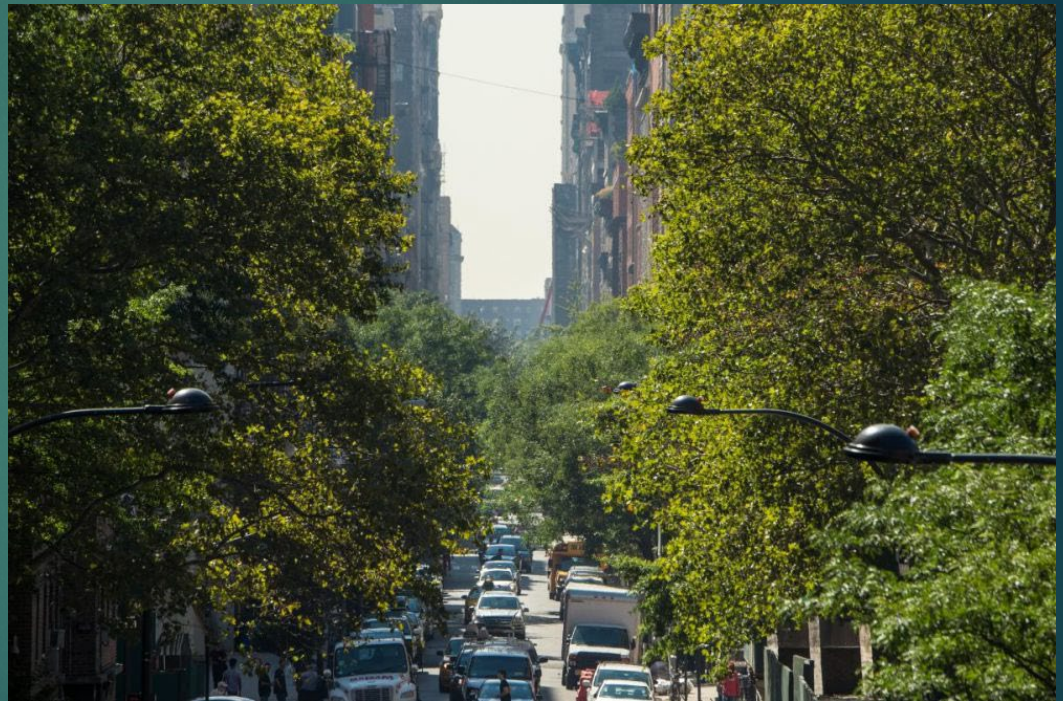


Conclusions

- ▶ Urban heat islands are a nexus point for urban environmental and other stressors. These negative impacts compound upon each other and have local and global impacts.
- ▶ Texas leads the nation in various heat related illness and death related statistics and needs to address growing urban temperature for their at-risk communities.
- ▶ Urban forests and trees uniquely are a cost-efficient mitigation strategy to deal with Urban Heat Island Impacts but growing the city and planting the trees must be done strategically to maximize benefits.

Questions?

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COMMUNITY-DRIVEN CLIMATE ADAPTATION PLANNING





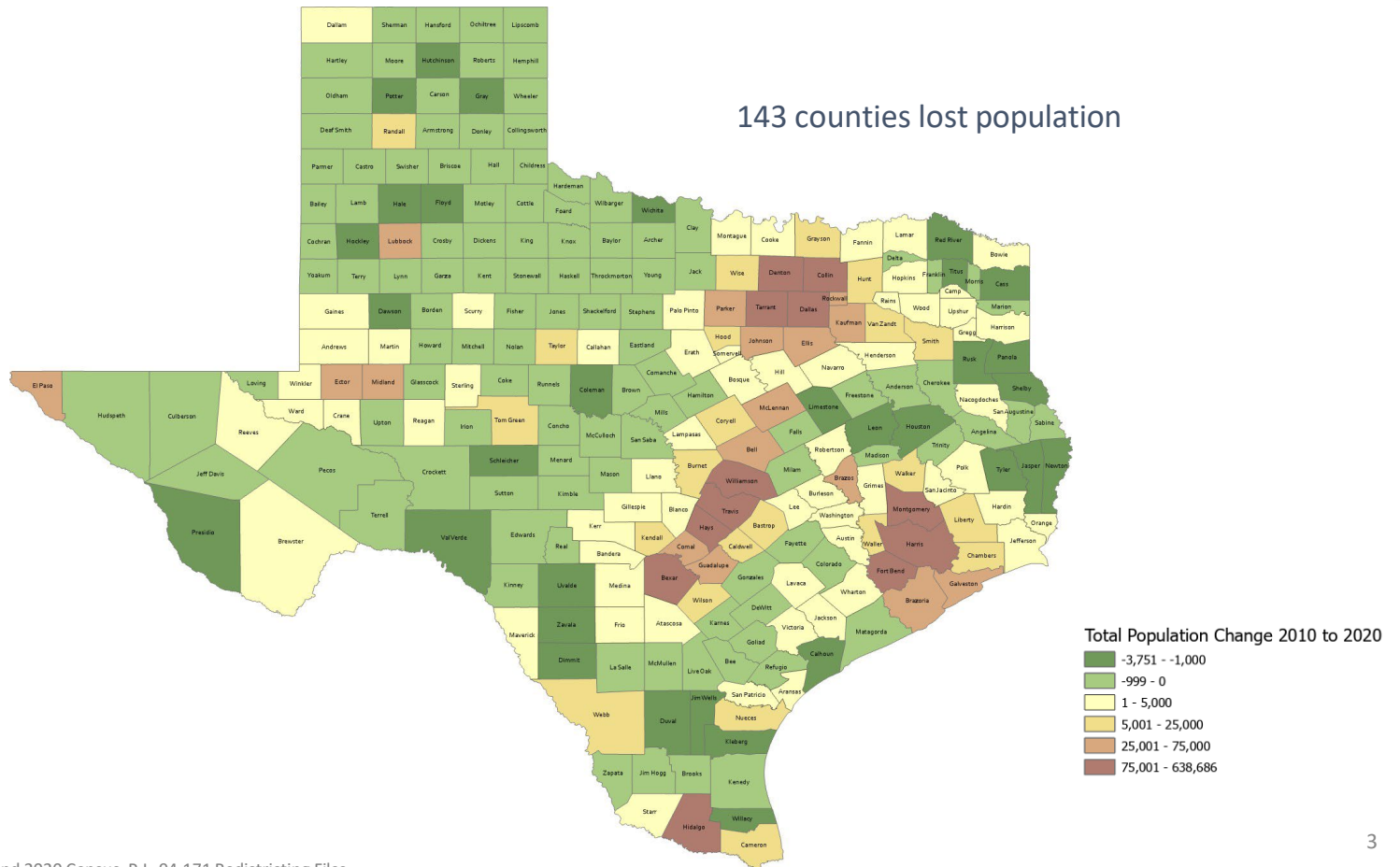
Population Growth and Congressional Seat Change

| | 2010 Population | 2020 Population | Numeric Change 2010- 2020 | Percent Change 2010- 2020 | Congressiona l Seat Change |
|----------------|--------------------|--------------------|------------------------------------|------------------------------------|----------------------------------|
| United States | 308,745,538 | 331,449,281 | 22,703,743 | 7.4% | |
| Texas | 25,145,561 | 29,145,505 | 3,999,944 | 15.9% | 2 |
| Florida | 18,801,310 | 21,538,187 | 2,736,877 | 14.6% | 1 |
| North Carolina | 9,535,483 | 10,439,388 | 903,905 | 9.5% | 1 |
| Colorado | 5,029,196 | 5,773,714 | 744,518 | 14.8% | 1 |
| Oregon | 3,831,074 | 4,237,256 | 406,182 | 10.6% | 1 |
| Montana | 989,415 | 1,084,225 | 94,810 | 9.6% | 1 |
| California | 37,253,956 | 39,538,223 | 2,284,267 | 6.1% | -1 |
| New York | 19,378,102 | 20,201,249 | 823,147 | 4.2% | -1 |
| Pennsylvania | 12,702,379 | 13,002,700 | 300,321 | 2.4% | -1 |
| Ohio | 11,536,504 | 11,799,448 | 262,944 | 2.3% | -1 |
| Michigan | 9,883,640 | 10,077,331 | 193,691 | 2.0% | -1 |
| Illinois | 12,830,632 | 12,812,508 | -18,124 | -0.1% | -1 |
| West Virginia | 1,852,994 | 1,793,716 | -59,278 | -3.2% | -1 |

Source: U.S. Census Bureau. 2010 and 2020 Census Count



Numeric Change, Texas Counties, 2010-2020



Source: US Census Bureau, 2010 and 2020 Census, P.L. 94-171 Redistricting Files



Top Counties for Percent Growth in Texas, 2010-2020*

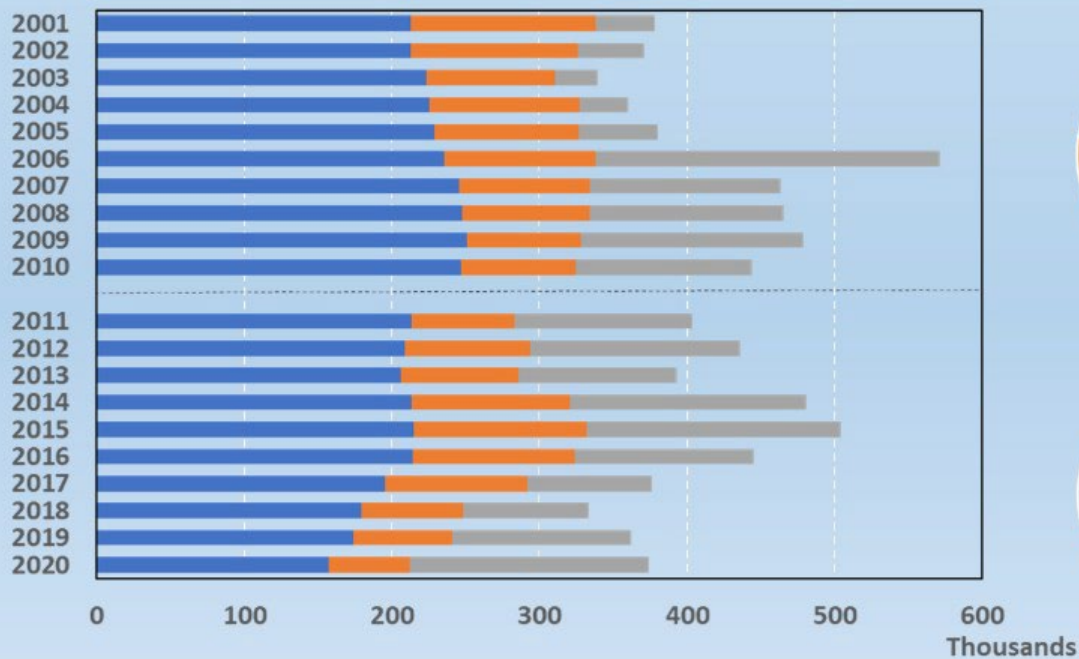
| County | US Rank | 2020 Population Estimate | Population Change 2010- 2020 | Percent Population Change 2010- 2020 | Percent of Population Change from Natural Increase | Percent of Population Change from Internation al Migration | Percent of Population Change from Domestic Migration |
|-----------------|-----------|--------------------------------|---------------------------------------|--------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------|
| Hays | 1 | 241,365 | 84,387 | 53.7% | 16.7% | 3.6% | 79.7% |
| Comal | 2 | 164,812 | 56,287 | 51.9% | 5.9% | 1.8% | 92.3% |
| Williamson | 6 | 617,855 | 195,084 | 46.2% | 20.4% | 5.6% | 74.0% |
| Fort Bend | 7 | 839,706 | 255,074 | 43.6% | 24.1% | 19.1% | 56.8% |
| Rockwall | 11 | 109,888 | 31,490 | 40.2% | 14.9% | 3.4% | 81.7% |
| Denton | 13 | 919,324 | 257,709 | 38.9% | 24.8% | 8.9% | 66.3% |
| Kaufman | 15 | 143,198 | 39,846 | 38.6% | 17.3% | 1.4% | 81.2% |
| Montgomery | 16 | 626,351 | 170,611 | 37.4% | 20.4% | 7.7% | 71.9% |
| Collin | 17 | 1,072,069 | 291,175 | 37.2% | 23.8% | 16.8% | 59.4% |
| Waller | 22 | 57,452 | 14,133 | 32.7% | 22.7% | 2.9% | 74.4% |
| Midland | 29 | 177,863 | 40,976 | 29.9% | 42.6% | 9.0% | 48.3% |
| Guadalupe | 31 | 170,608 | 39,086 | 29.7% | 19.9% | 2.1% | 78.0% |
| Ellis | 35 | 191,760 | 42,111 | 28.1% | 21.8% | 2.1% | 76.1% |

Source: US Census Bureau, 2020 Evaluation Population Estimates *Among counties with populations of 50,000 or more in 2020

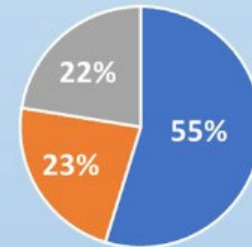


Components of Change, Texas 2000-2020

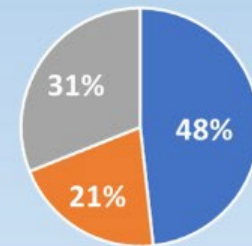
■ Natural Increase ■ Net International Migration ■ Net Domestic Migration



2000-2010



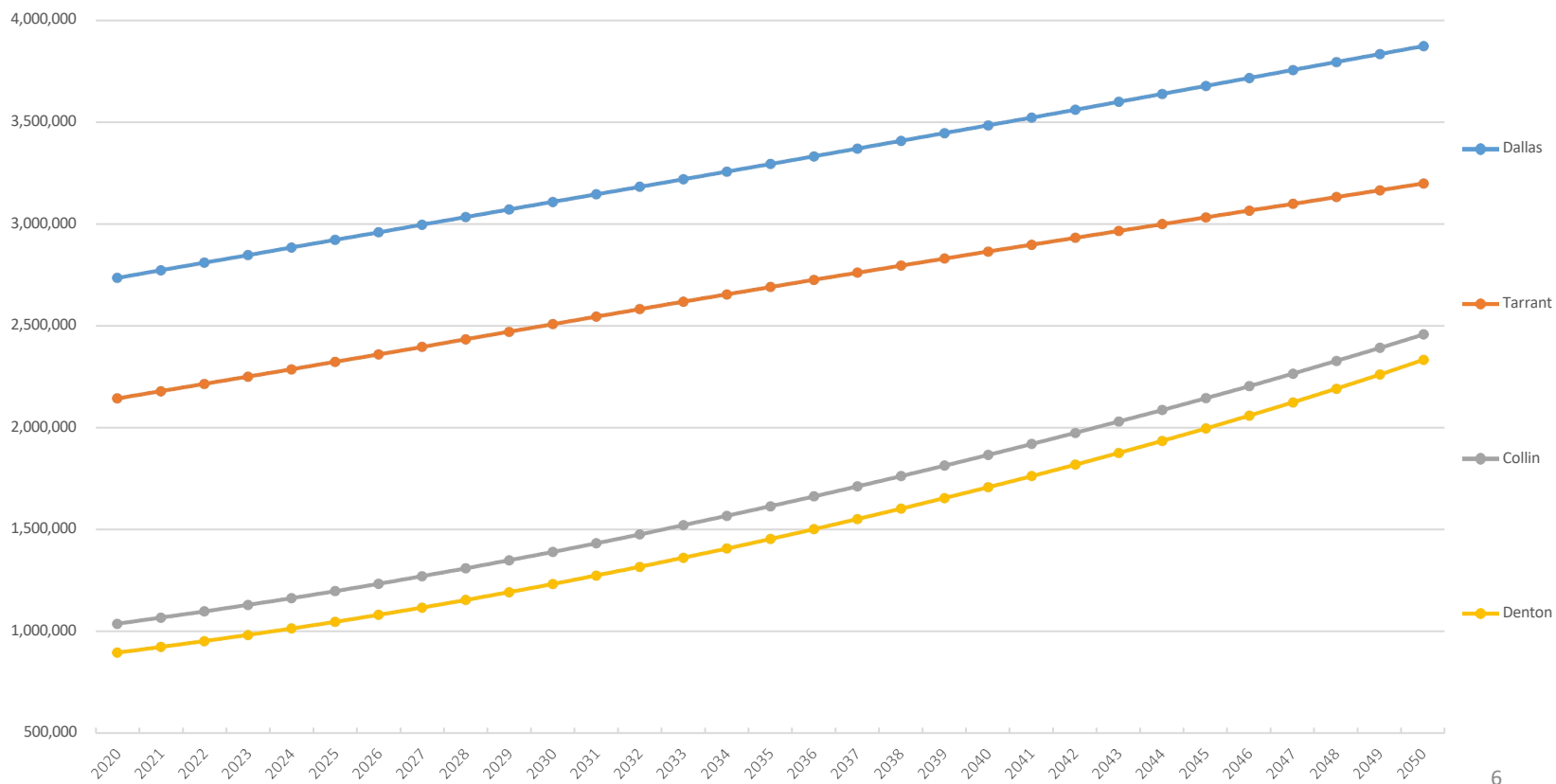
2010-2020



Source: U.S. Census Bureau. 2010 and 2020 Vintage Population Estimates



Population Projections, DFW Metro Largest Counties, 2020-2050



Source: Texas Demographic Center, 2018 Population Projections

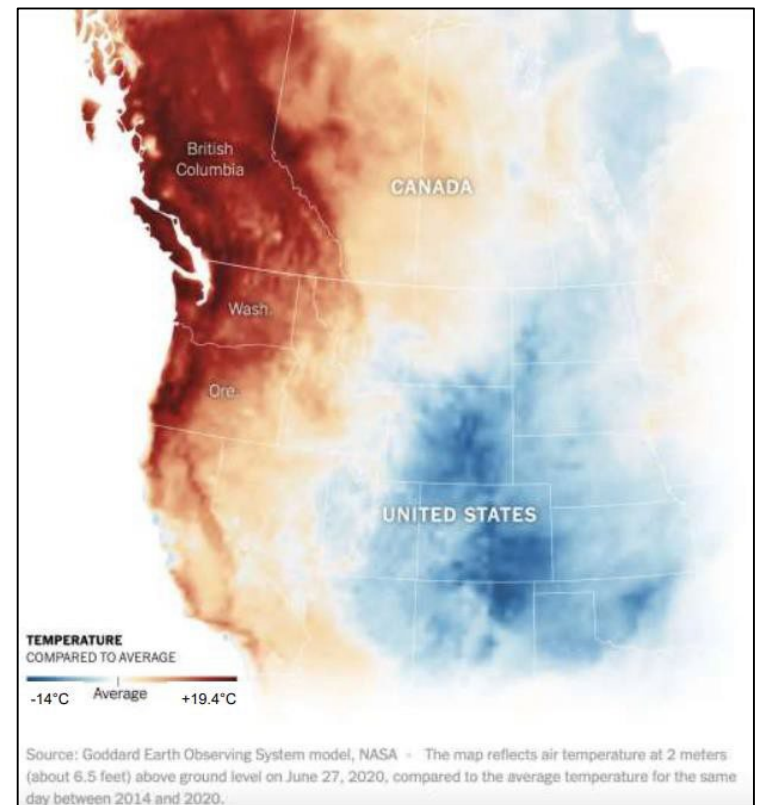
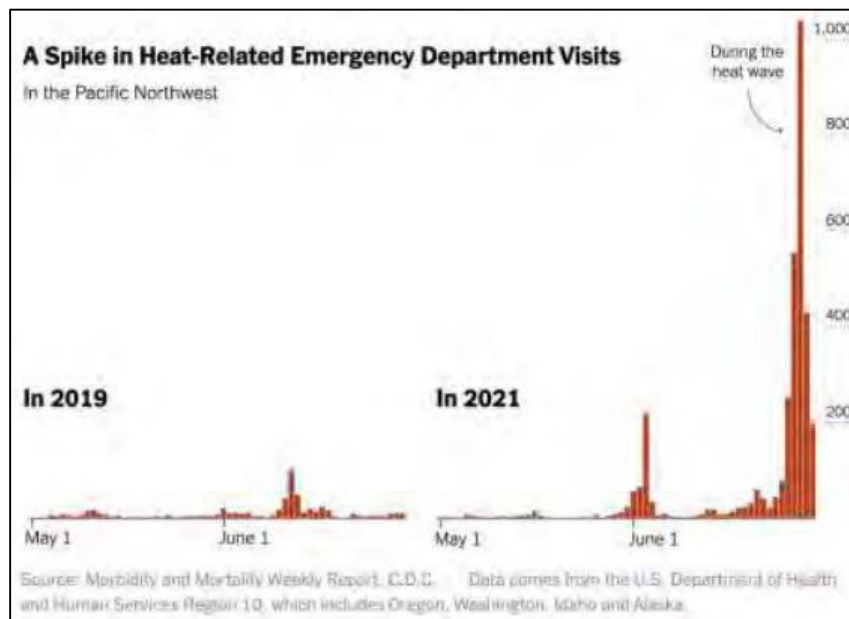
A NATIONAL DILEMMA : 16 of the 17 warmest years on record occurred since 2001



| | |
|-----------|-------------|
| #1 | 2016 |
| #2 | 2020 |
| #3 | 2019 |
| #4 | 2015 |
| #5 | 2017 |

Northwestern US Heat Wave, June 2021

2,779 heat-related emergency department visits in 6 days!



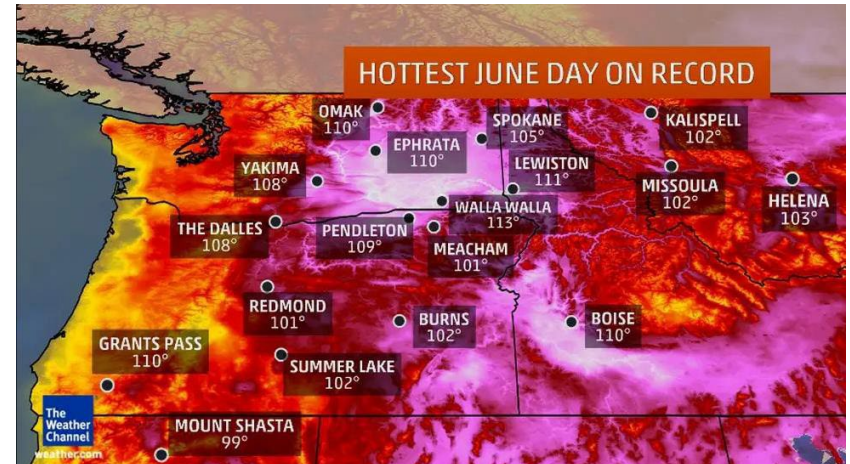
Northwestern US Heat Wave, June 2021



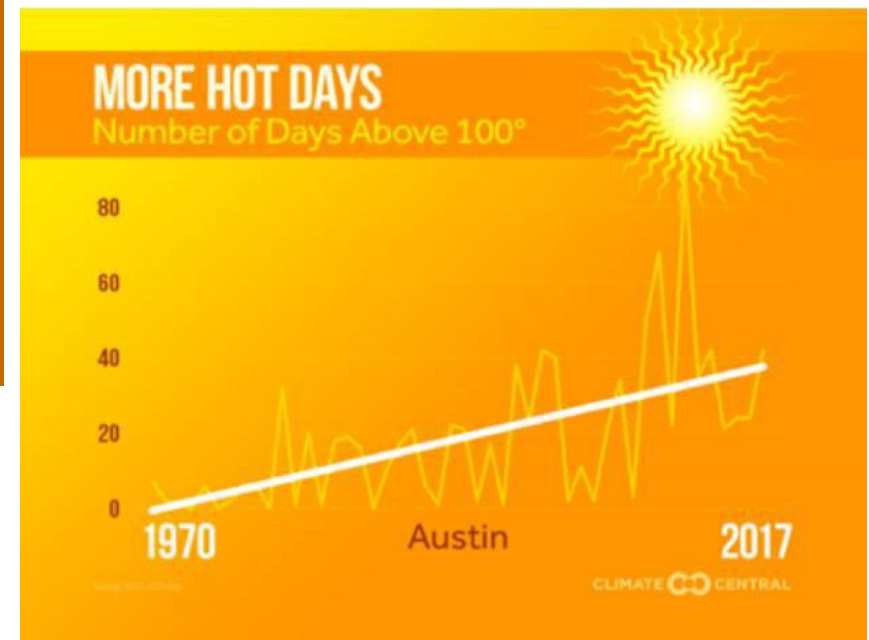
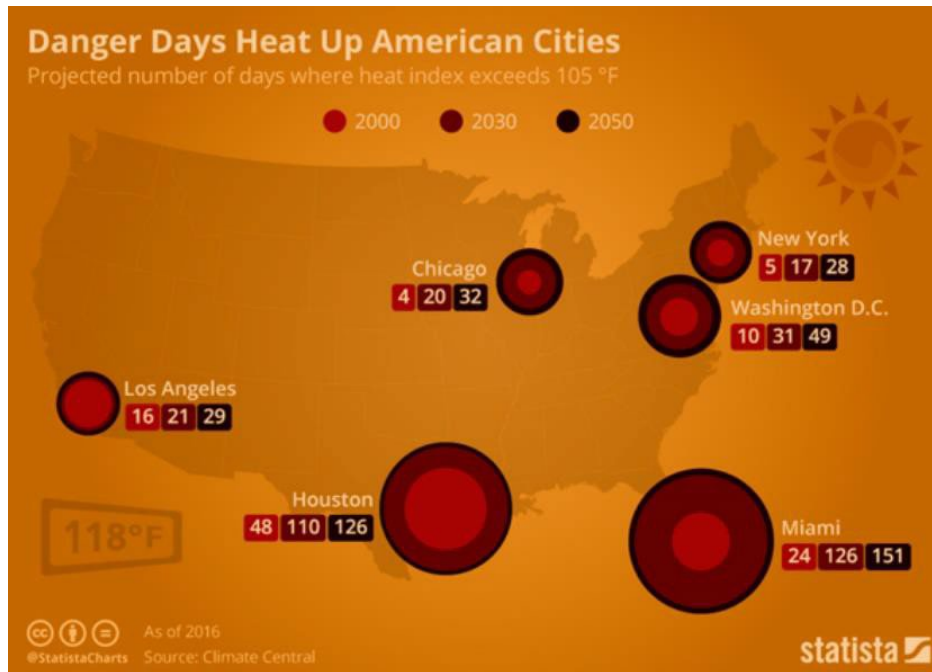
In case you're wondering why we're canceling service for the day, here's what the heat is doing to our power cables.



7:07 PM · Jun 27, 2021 · Hootsuite Inc.



A NATIONAL DILEMMA : US cities are going to keep getting hotter



The Washington Post

Humidity and heat extremes are on the verge of exceeding limits of human survivability, study finds

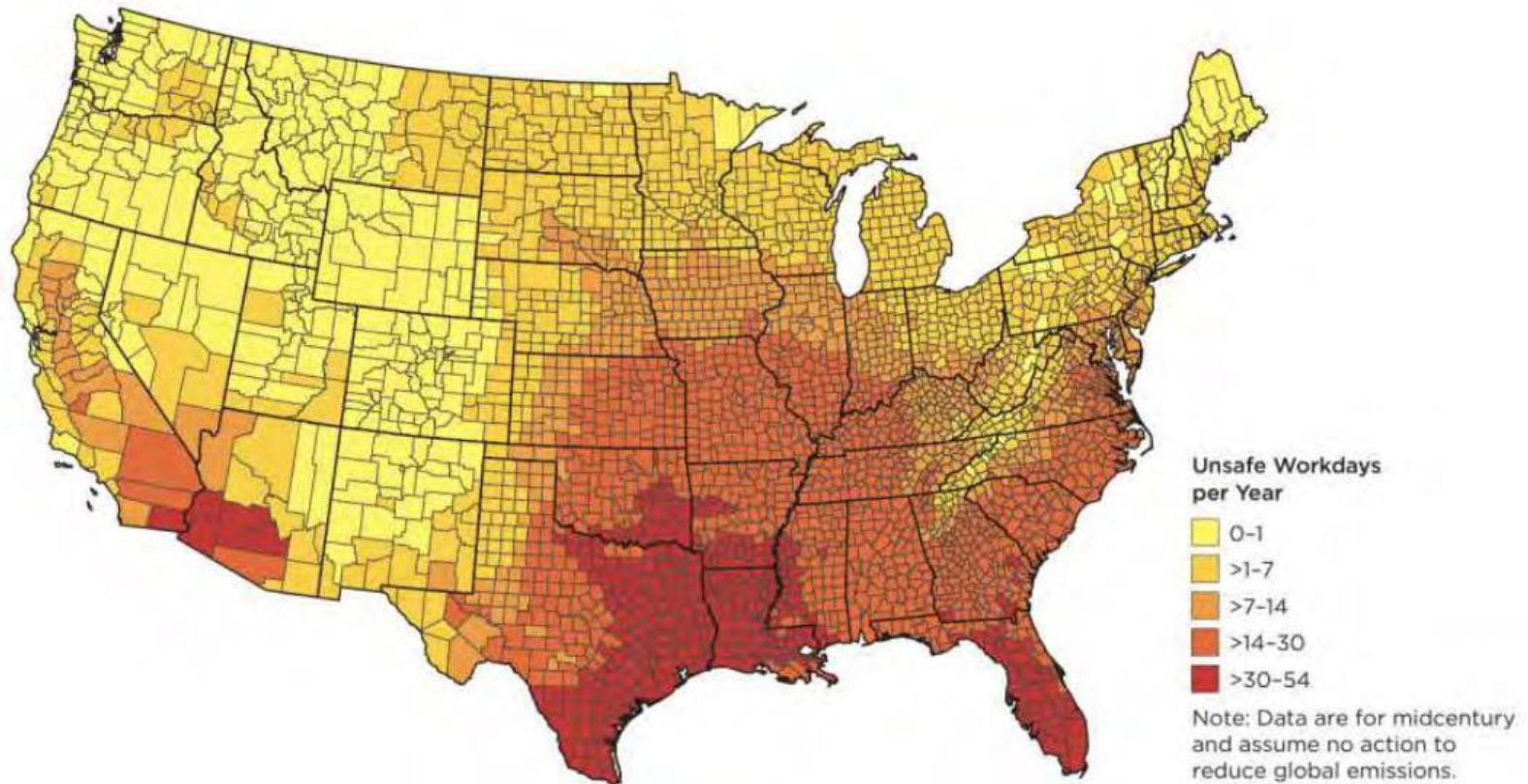
Humans cannot survive prolonged exposure to certain combinations of heat and humidity

By [Andrew Freedman](#) and [Jason Samenow](#)

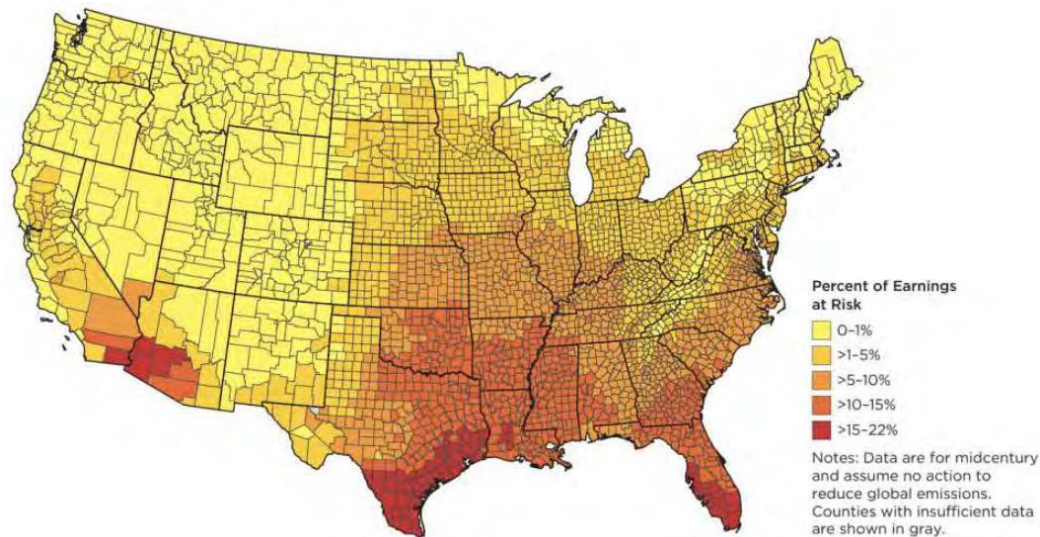
May 8, 2020 at 4:21 p.m. EDT



Unsafe Workdays per Year: UCSUSA, 2021



Percent of Earnings at Risk: UCSUSA, 2021

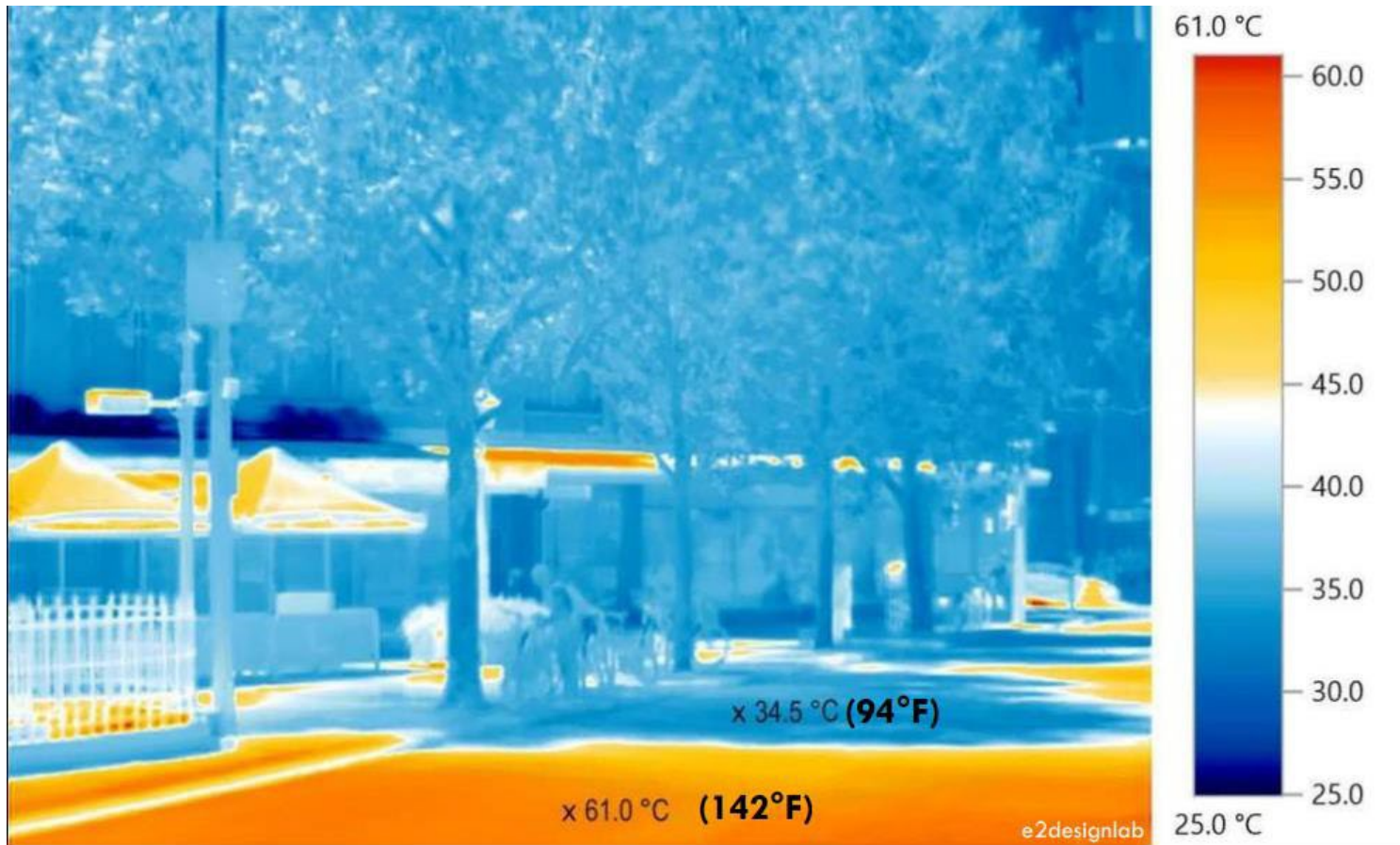


Extreme Heat Could Threaten \$2.1 Billion Annually in Georgia Outdoor Worker Earnings by Midcentury

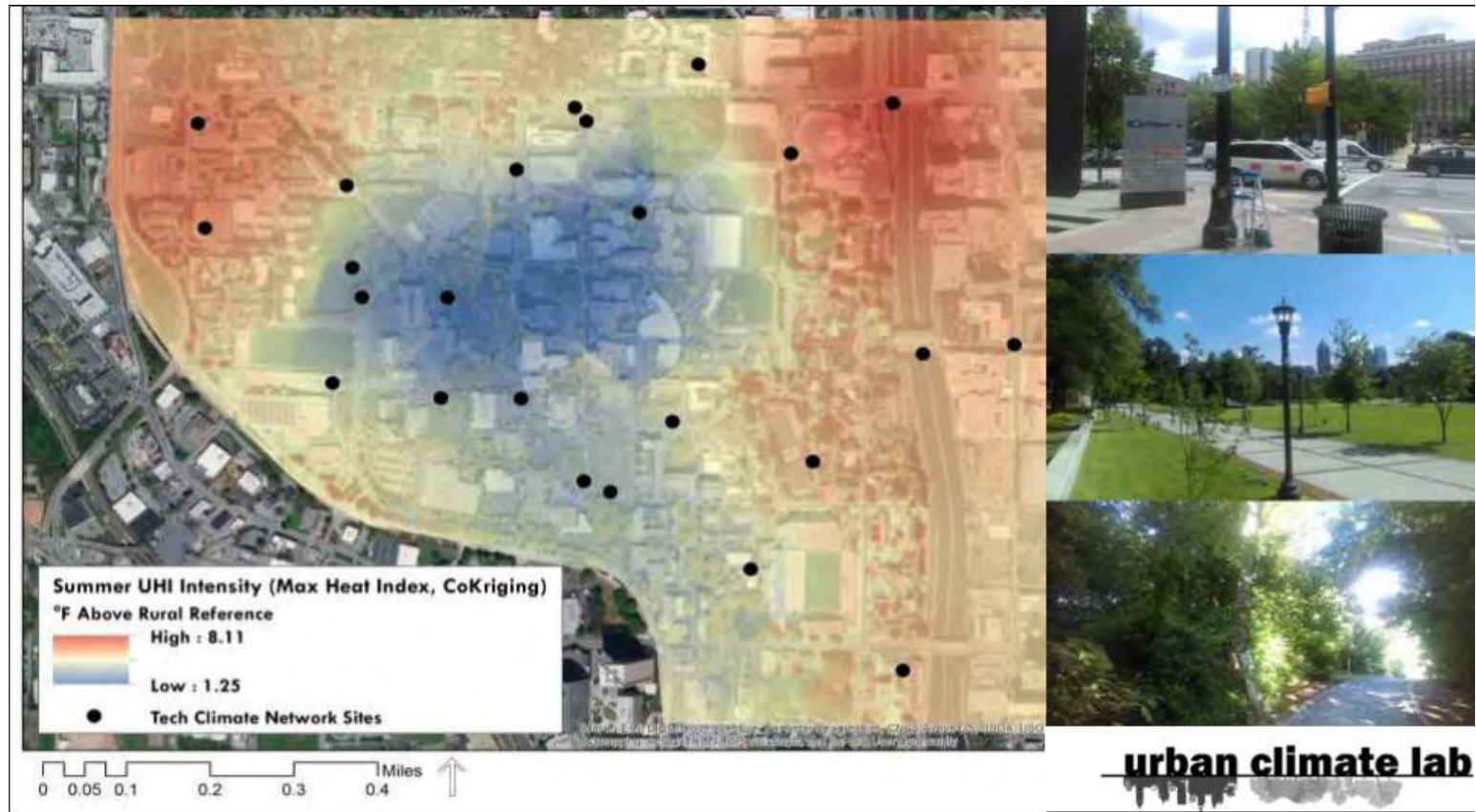
Nation, Georgia Lack Mandatory Standards to Keep Workers Safe as US Extreme Heat Days Set to Quadruple

Published Aug 15, 2021

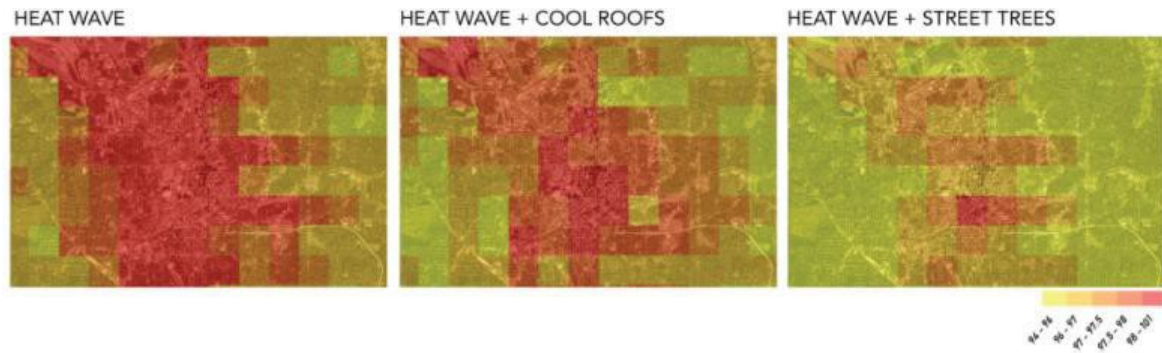
What is the Urban Heat Island Effect?



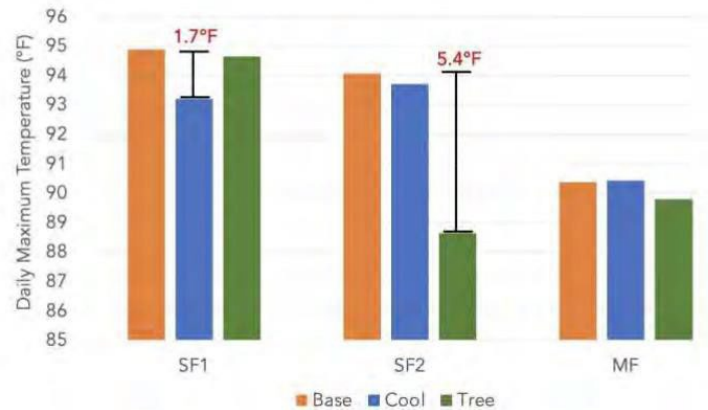
What is the Urban Heat Island Effect?



Community-Driven Climate Adaptation Planning



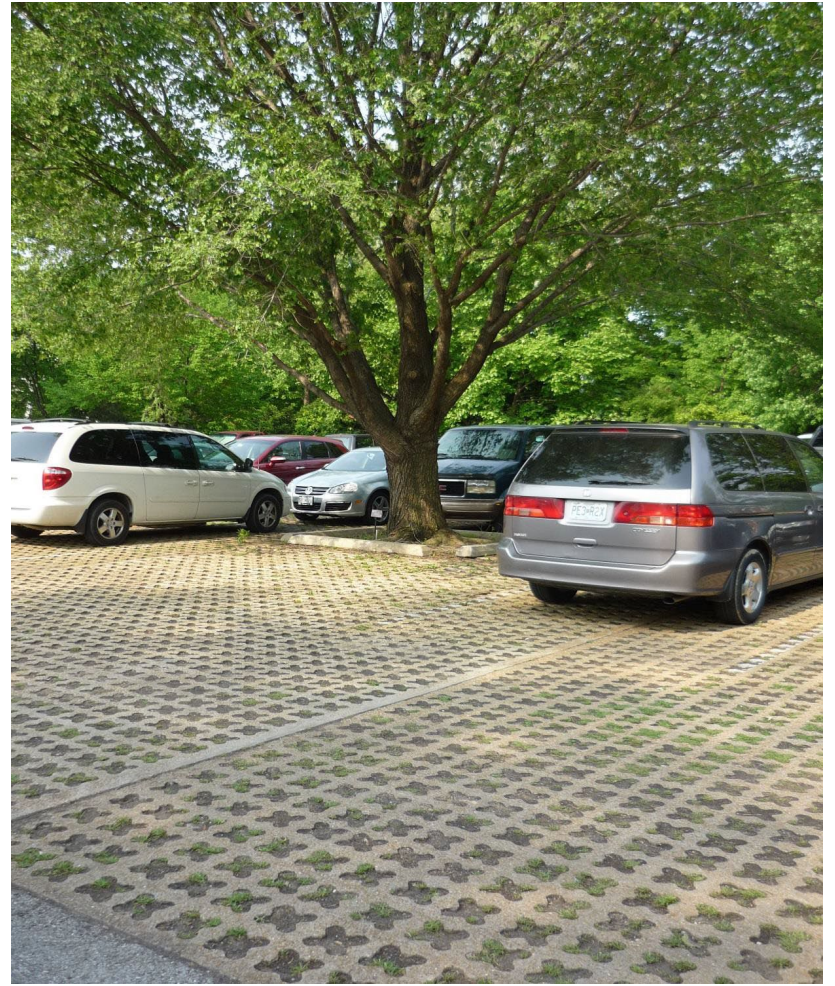
Heat Management Strategies: Atlanta

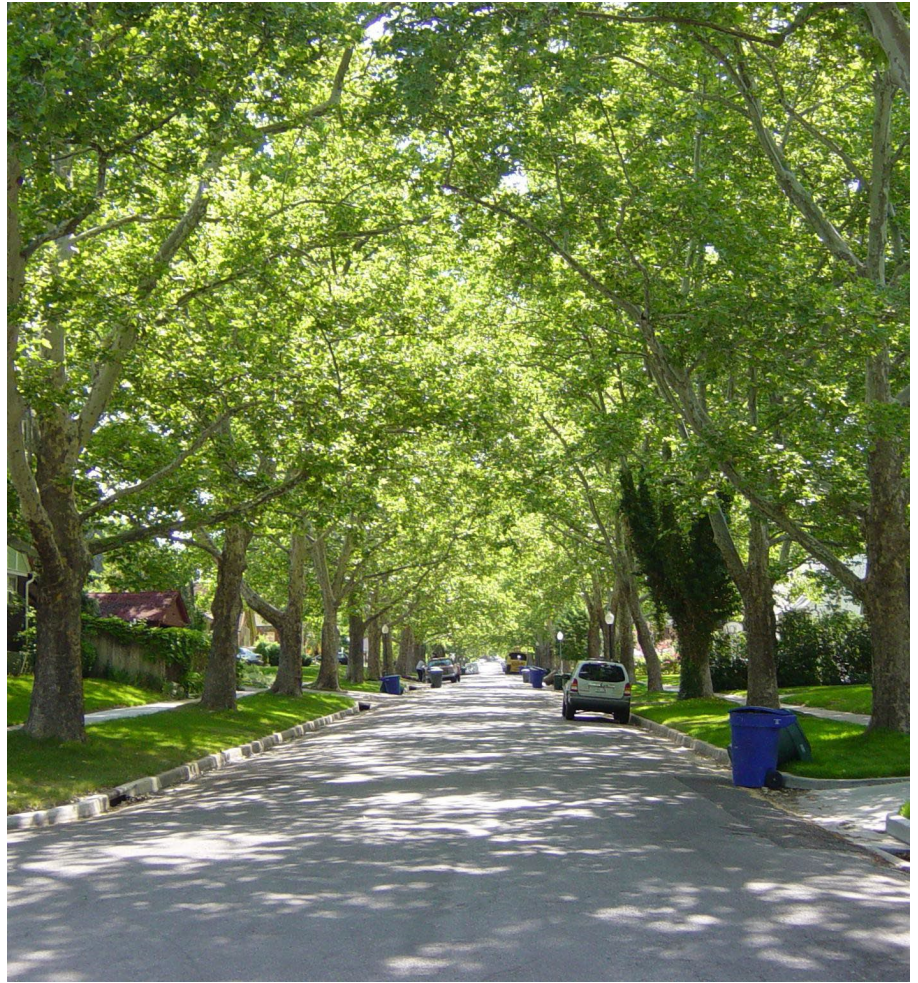




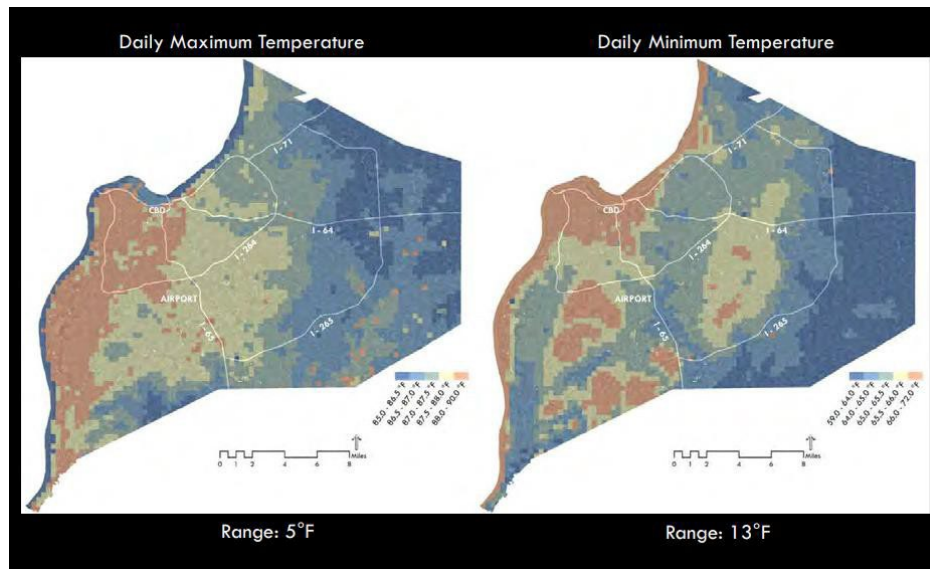








Louisville Kentucky Urban Heat Management Study



Louisville has implemented a combination of strategies



PRESS RELEASE

Green Heart Project Launches in Louisville

TNC partners with the University of Louisville and others on a first-of-its-kind study into the human health benefits of urban greening.



PARTNERSHIPS

Louisville: YouthBuild Tree Inventory

The YouthBuild Louisville team inventoried trees and monitored tree health for TNC's Green Heart project.



PARTNERSHIPS

Growing a Better Community

Ked Stanfield of Louisville Grows is helping to put trees in the ground in the Green Heart project study area.



GREEN HEART

Louisville Heat Management:
Cool502

#cool502
GREENING | COOLING | CONSERVING

Cool Asphalt Shingles



Flat White Roof



Cool Metal Roof



City of Philadelphia Green Streets Program



With a Green Makeover, Philadelphia Is Tackling Its Stormwater Problem

In a major initiative, Philadelphia is building an extensive network of rain gardens, green roofs, wetlands, and other infrastructure to capture stormwater. The goal is to prevent runoff from overwhelming sewers and polluting waterways and to help green America's fifth-largest city.

BY BRUCE STUTZ · MARCH 29, 2018



City of Cambridge

Cambridge MA

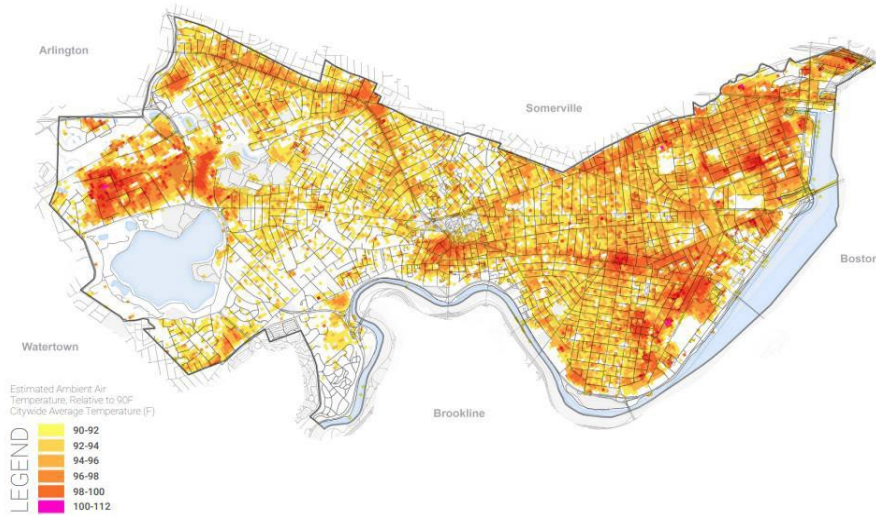
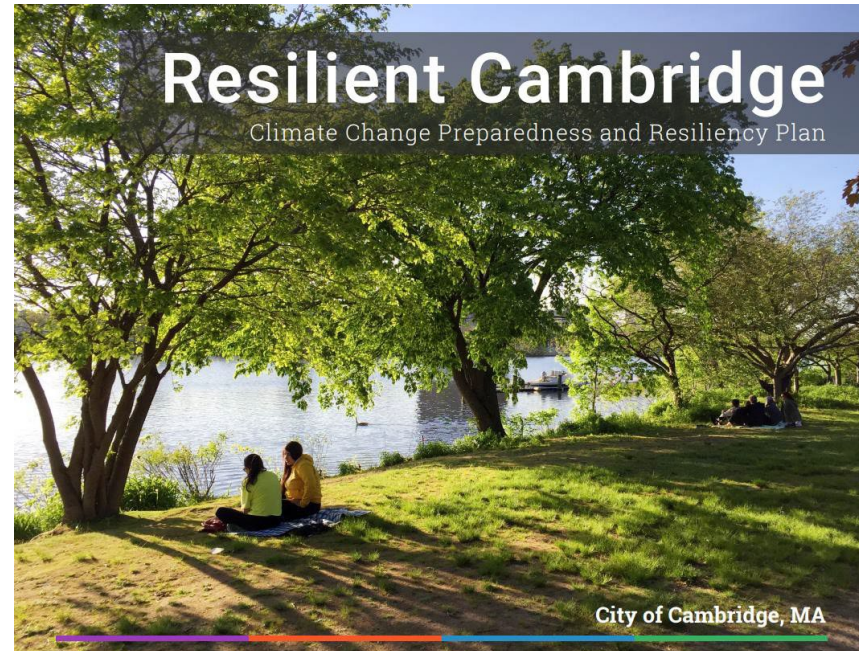


Figure 5. The map shows the modeled ambient air temperature for existing conditions in 2018 relative to a 90°F citywide average temperature.
Source: Urban Heat Island Technical Memorandum, Kleinfelder for the City of Cambridge, 2020

Resilient Cambridge

Climate Change Preparedness and Resiliency Plan



City of Cambridge

City Pilots Pavement Surface Treatment to Reduce Urban Heat Island Effect

June 21, 2021

MUNICIPAL FACILITIES IMPROVEMENT PLAN



A healthy forest
is a vital part of a
healthy city.



ECONOMIC IMPACT OF GREAT STREETSCAPES



**BAGBY STREET
HOUSTON, TX**

- **\$55 million** in reinvestment along the corridor.
- **22%** increase in lease rates along the corridor.



**CHERRY CREEK
NORTH
DENVER, CO**

- **16%** in district sales tax in just the first year.
- This was more than double the rates of increase for both the city and the entire Denver Metro Area.



**LINCOLN ROAD
MIAMI, FL**

- **85%** increase in the total assessed value of properties within 1/2 block of improvements.
- **80% (1.2 million)** increase in property values.



**UPTOWN STREETSCAPE
NORMAL, IL**

- **\$1.5 million (or 9%)** of increased property values.
- **\$680,000** increased revenue by adjacent conference center.



**SOUTH GRAND BLVD
ST. LOUIS, MO**

- **14%** increase in sales tax after 1st year. Proforma projected a **19%** increase over 10 years.



THANK YOU
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URBAN HEAT ISLAND MITIGATION: CANOPY COVER AND TREE EQUITY

Texas Trees Foundation

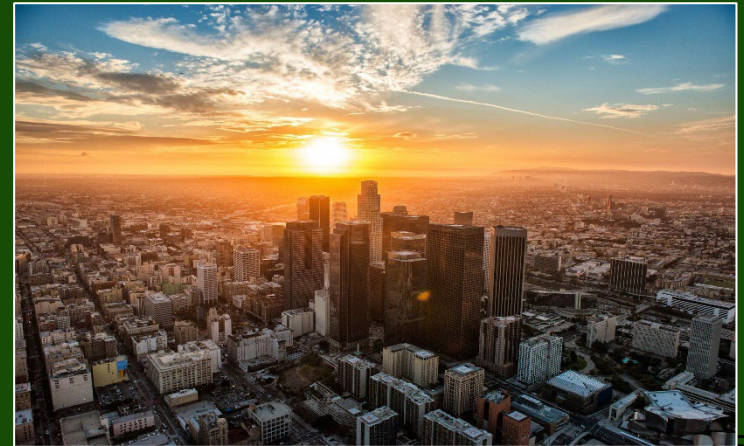
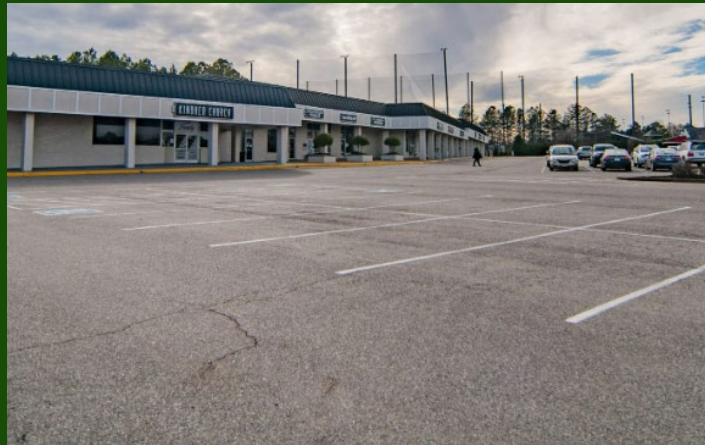
Cheri Cuellar – Urban Forestry Coordinator

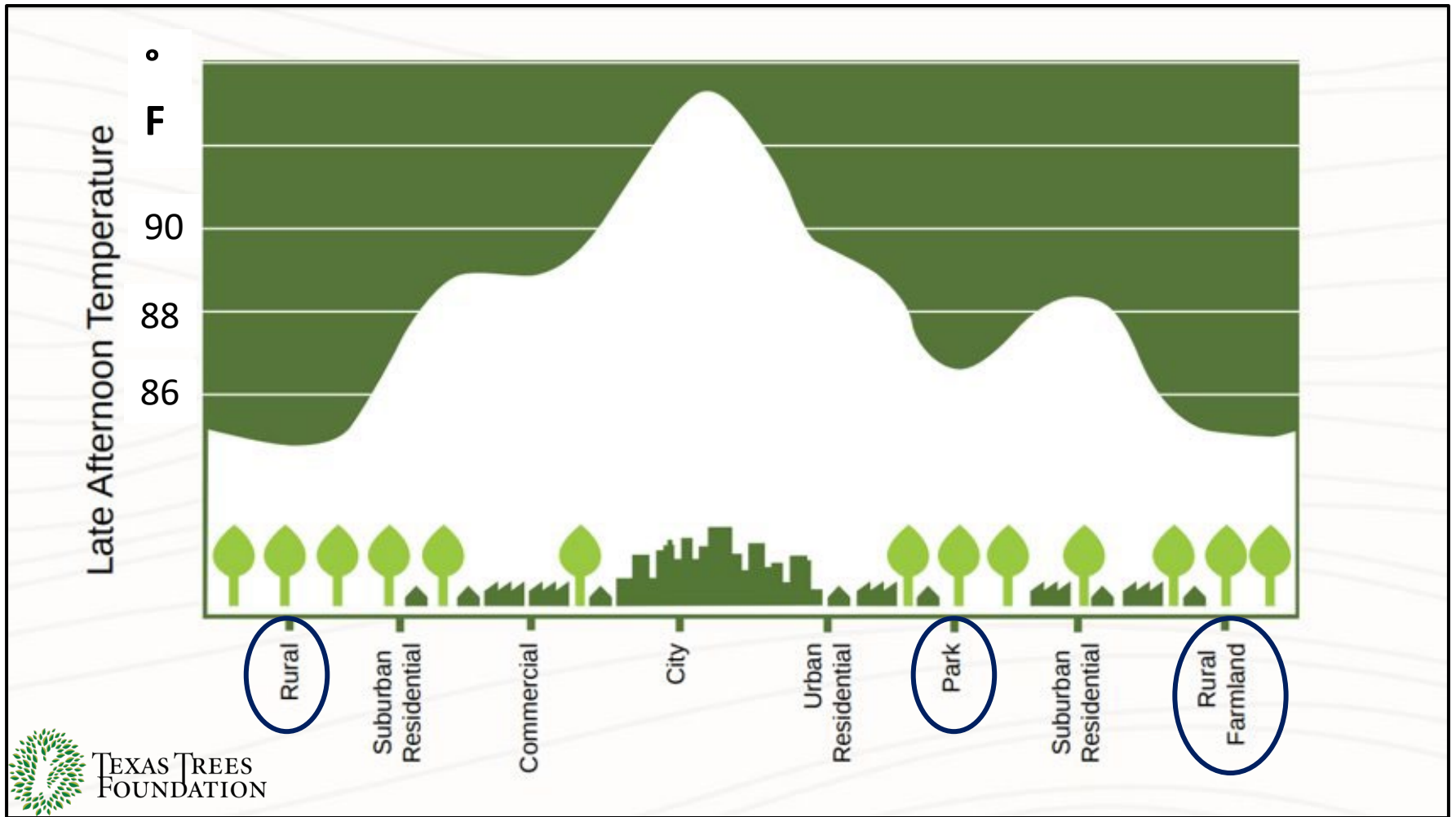


TEXAS TREES
FOUNDATION

SOURCES OF URBAN HEAT

Urban structures such as buildings and pavement absorb and re-emit sun's heat more than natural landscapes such as forests, grasslands, and water bodies.





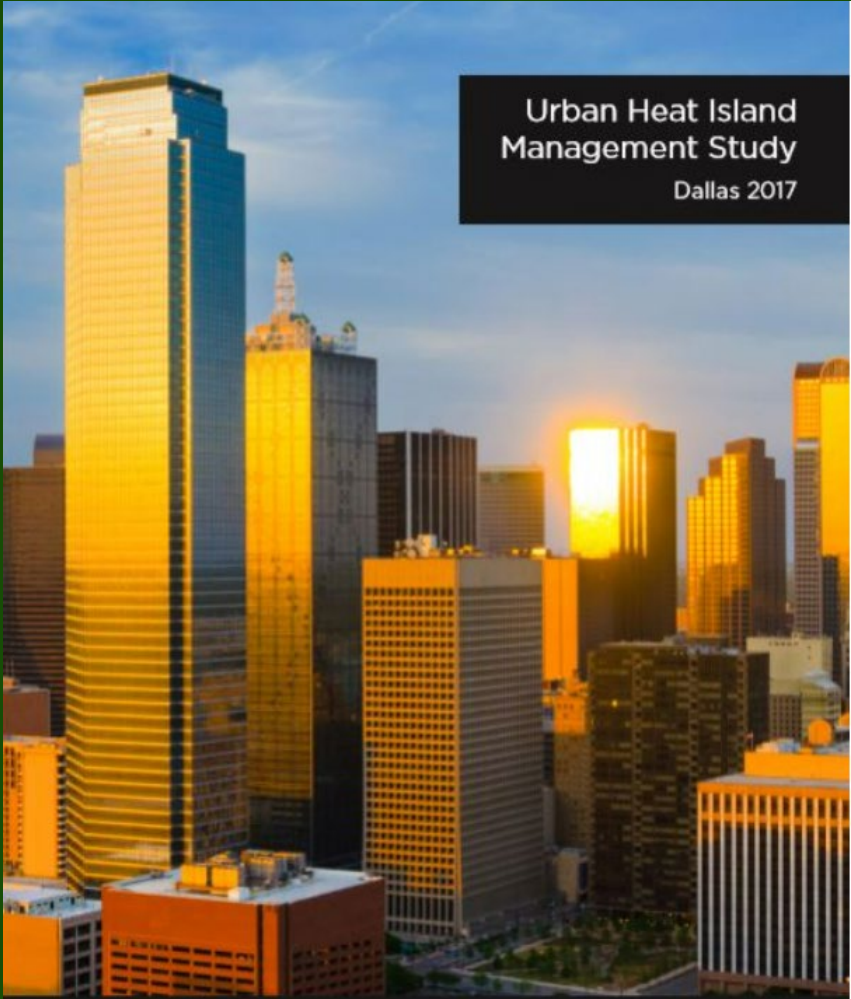
WHAT DRIVES THE URBAN HEAT ISLAND EFFECT?



A heat map of the United States where colors represent temperature ranges. Darker reds and oranges indicate higher temperatures, while greens and yellows indicate lower temperatures. The map shows a clear gradient from cooler temperatures in the north and west to warmer temperatures in the south and east. State boundaries are outlined in black, and various numerical values are scattered across the map, likely representing specific temperature readings or indices for different regions.

HOW WE'RE IMPACTED

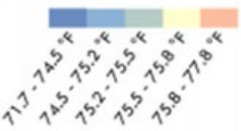
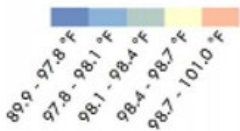
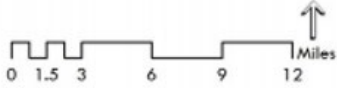
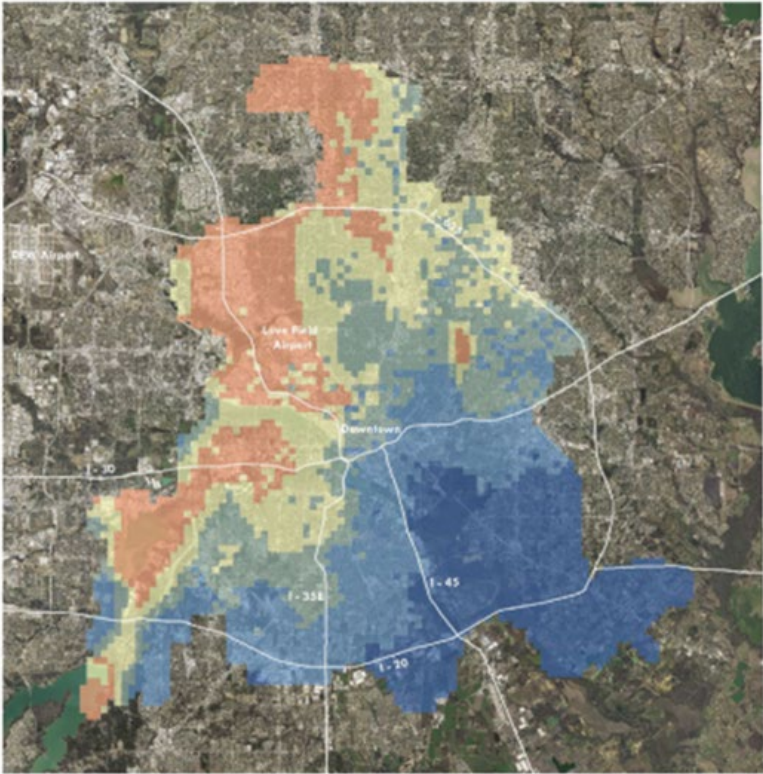
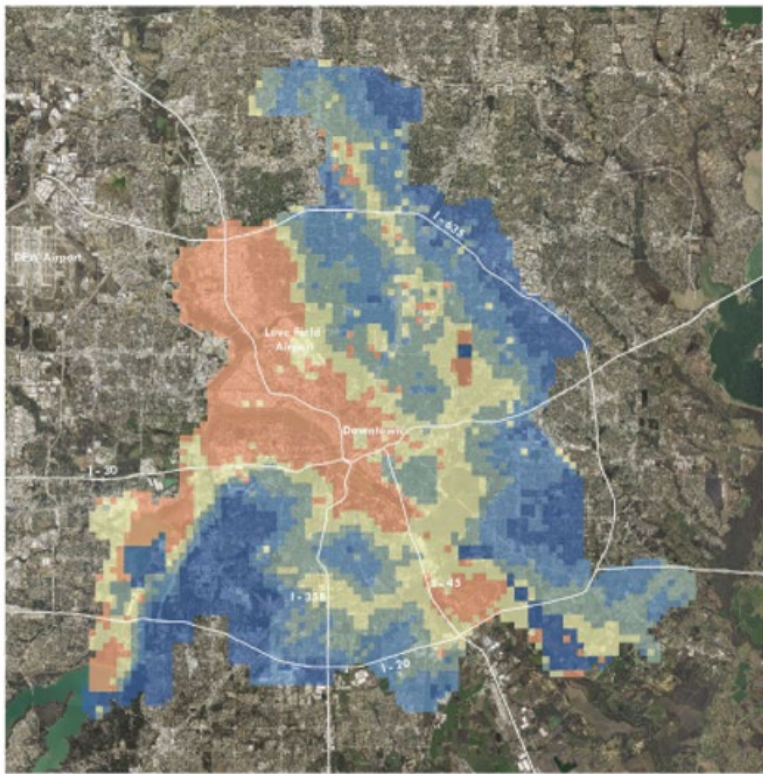
- More than 80% of Americans live in urban areas
- Heat waves deter outdoor activity
- Not all community members are equally affected by extreme heat



Urban Heat Island Management Study

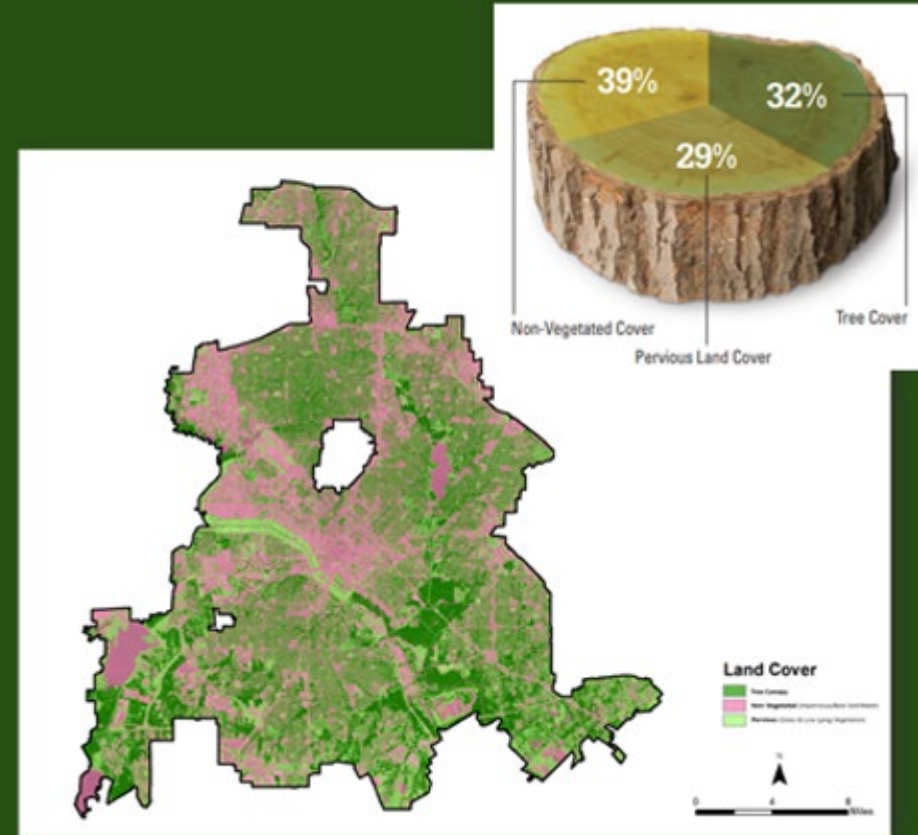
Dallas 2017

URBAN HEAT ISLAND DAILY HIGH & LOW TEMP



Dallas Land Cover

- 32% Tree Canopy (Dark Green)
- 29% Pervious Cover (Light Green)
- 39% Other (Pink)
- 14.7 million trees in Dallas
 - 46% in Great Trinity Forest
 - 54% in remainder of City
- 70% of tree canopy outside the GTF is on private, residentially-zoned property



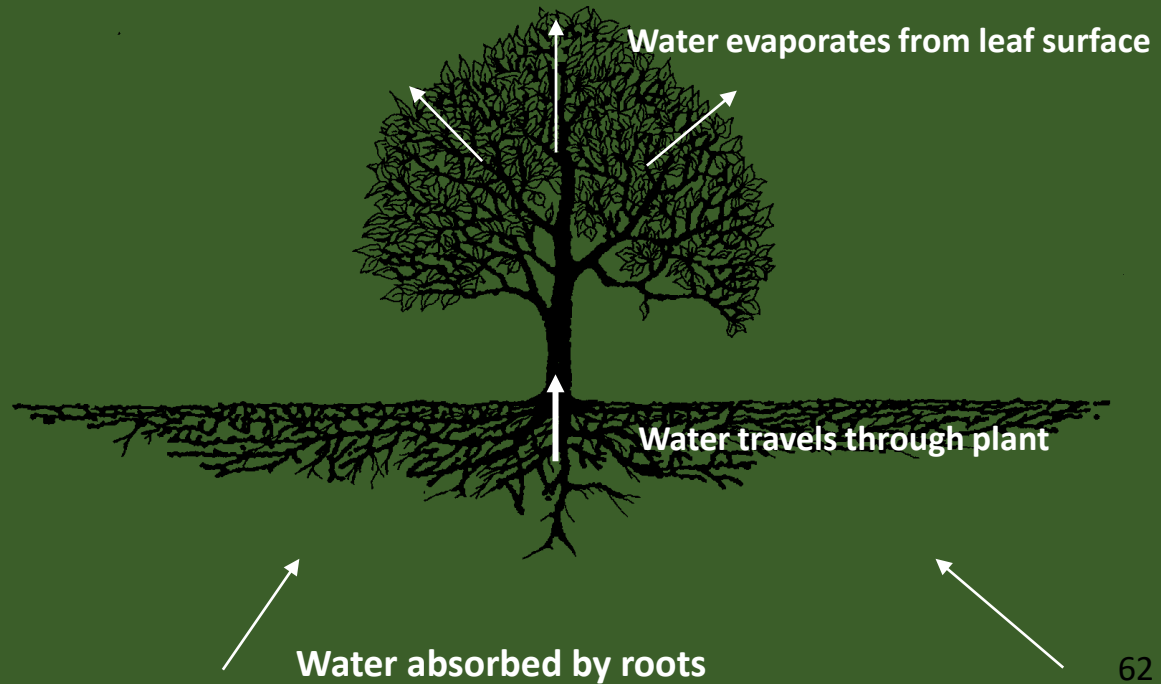
Heat Mitigation

- Trees shading reflective roofing and paving materials reduce summer afternoon temperatures by as much as 15 F.
- Shading protects infrastructure
- Provides more cooling benefit than cool materials
- Expanded tree canopy is the most effective strategy available for heat management in Dallas
- Related Benefits: Improved Air Quality and Stormwater Management



COOLING PROCESS

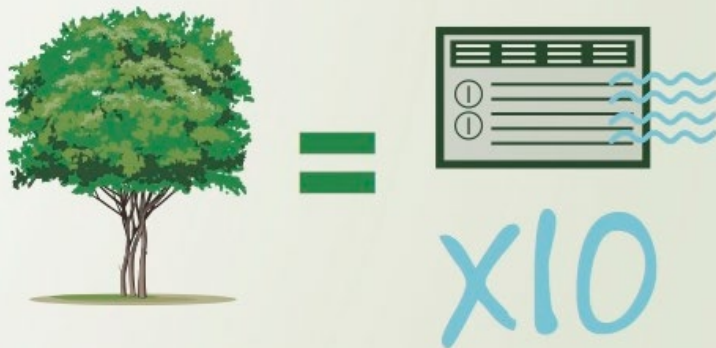
SHADE & EVAPOTRANSPIRATION



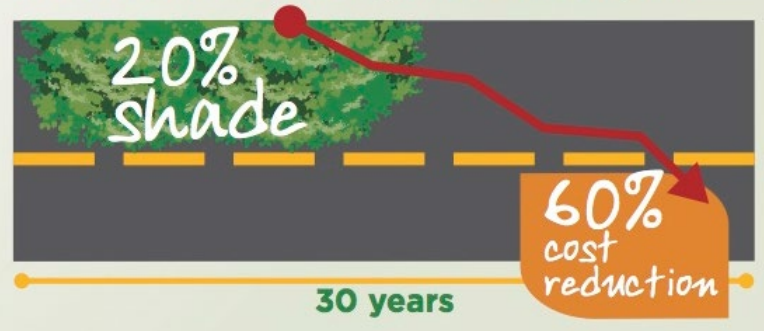
TREE BENEFITS QUANTIFIED

Tree planting is 3x more effective than other cooling methods

The net cooling of a young healthy tree is the equivalent to **10 room-sized air conditioners**



Roads that have **20% shade** have a **60% reduction** in resurfacing cost over **30 years**.



INCREASING TREE CANOPY



PRESERVE



PLANT



ADVOCATE



TEXAS TREES
FOUNDATION

Creating Cleaner, Greener, & Healthier Cities

"Branching Out" Park Plantings



Cool Schools Program

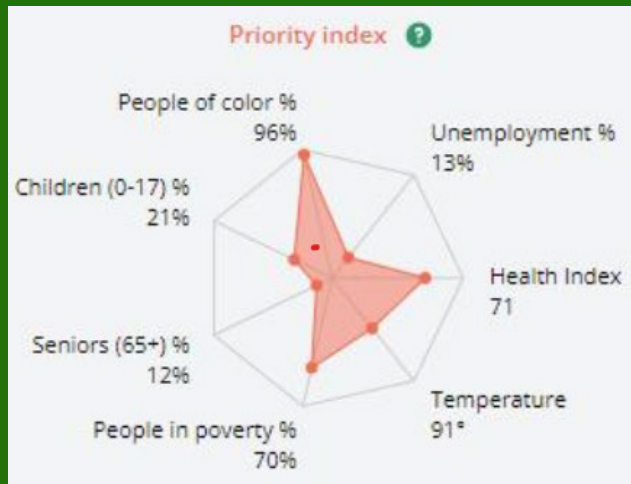
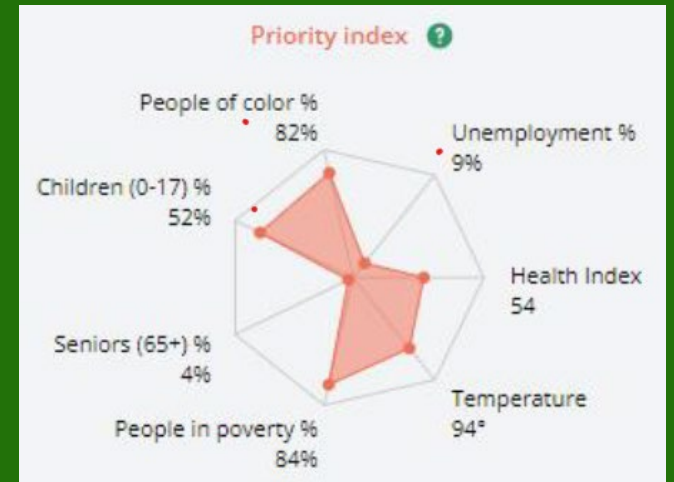


Southwestern Medical District
Streetscape + Park Development



Connecting & Celebrating Trees and People





Cool Schools Neighborhood Park Program: Components



Outdoor Learning Area



Trees

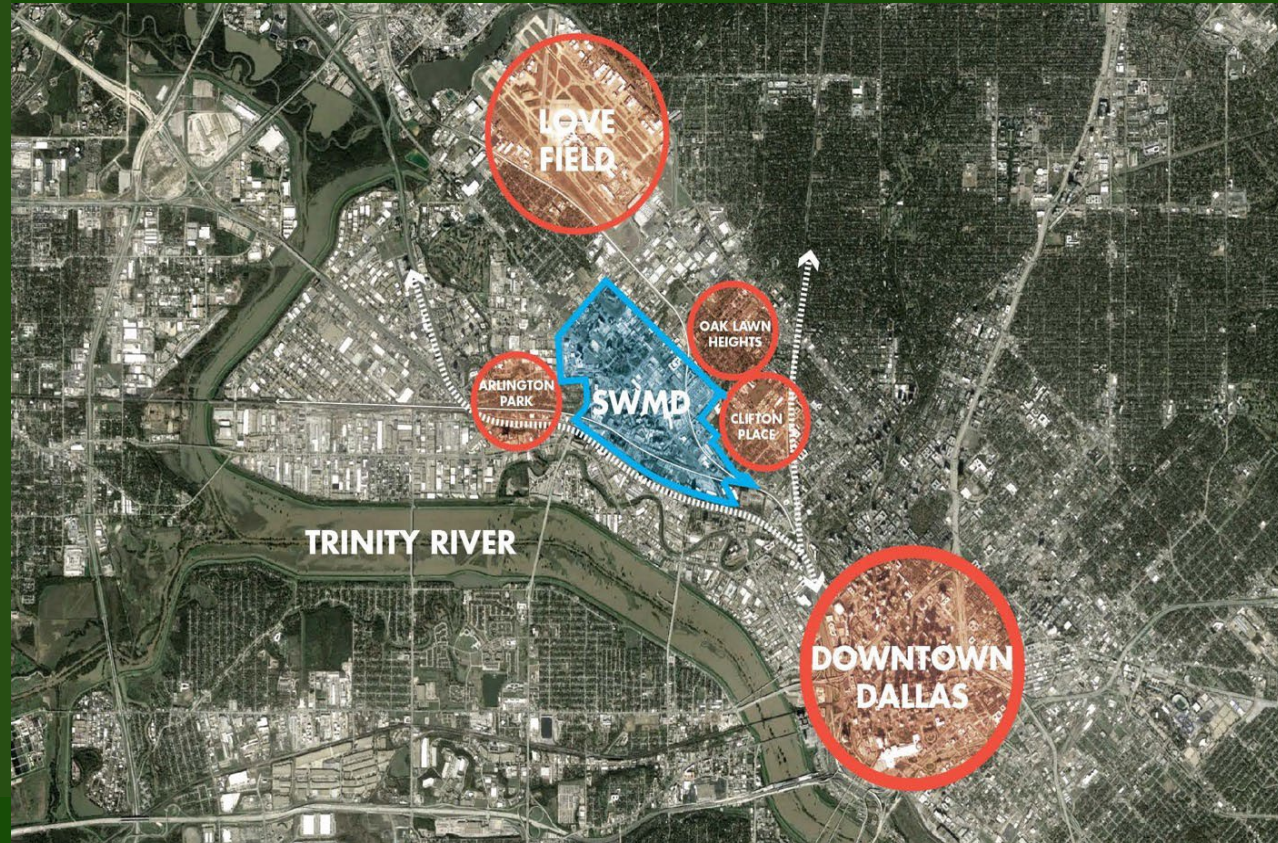


New Playground & Walking
Trail



Southwestern Medical District Project

- **37,000** employees
- **2.8 million** annual visits to clinics & ERs
- **3,600** students/residents/fellows
- **23,000** residents living near the District
- **16+ miles** of transportation corridors
- **35,000-45,000** vehicles per day projected on Harry Hines
- **7% Tree Canopy**



Initial Data Collection to Inform Design

MICRO-CLIMATE MONITORS

- Tracking air quality and comfort index at the **pedestrian level**
- To be installed at key design areas, as informed by engagement

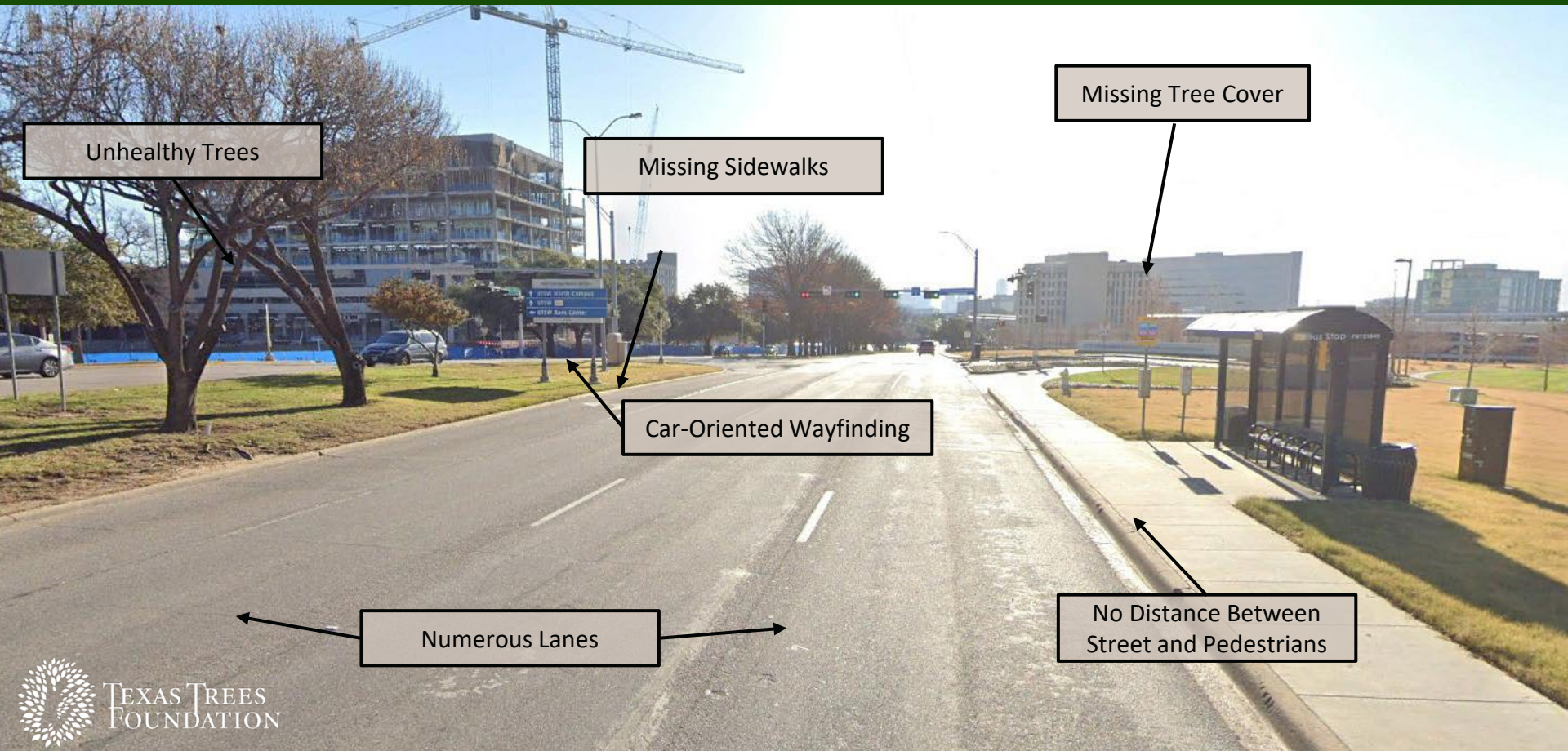
BREATHE EASY AIR MONITORS

- TTF, City of Dallas, Nature Conservancy, Texas Transportation Institute (TTI) and Center for Advancing Transportation Emissions, Energy, and Health (CARTEEH)
- 3 monitors have been installed in the District
 - Harry Hines at Medical District Drive
 - Harry Hines at Record Crossing
 - Inwood Rd at Southwestern Medical Avenue



Breathe Easy Air Monitor

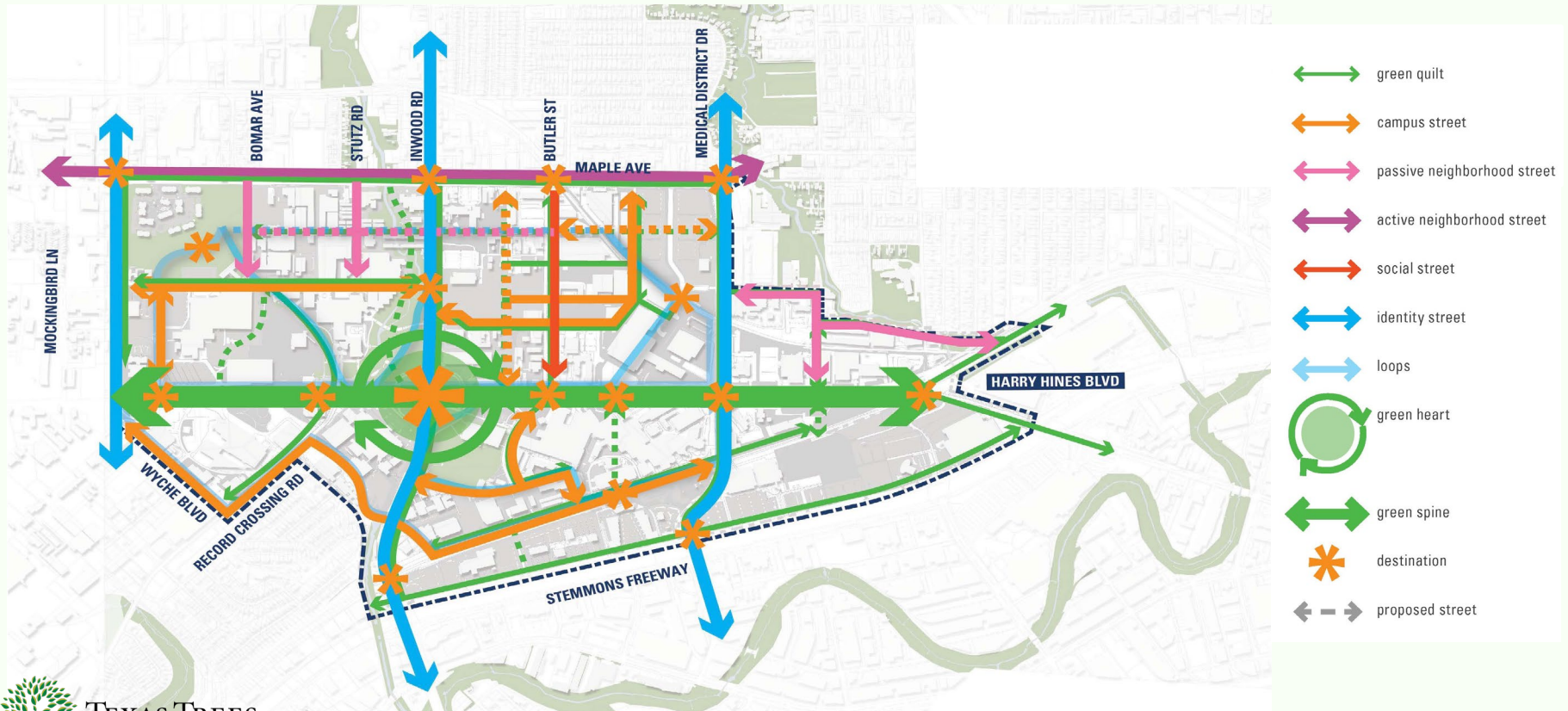
Streetscape Critical Issues – Harry Hines Blvd



Existing Conditions



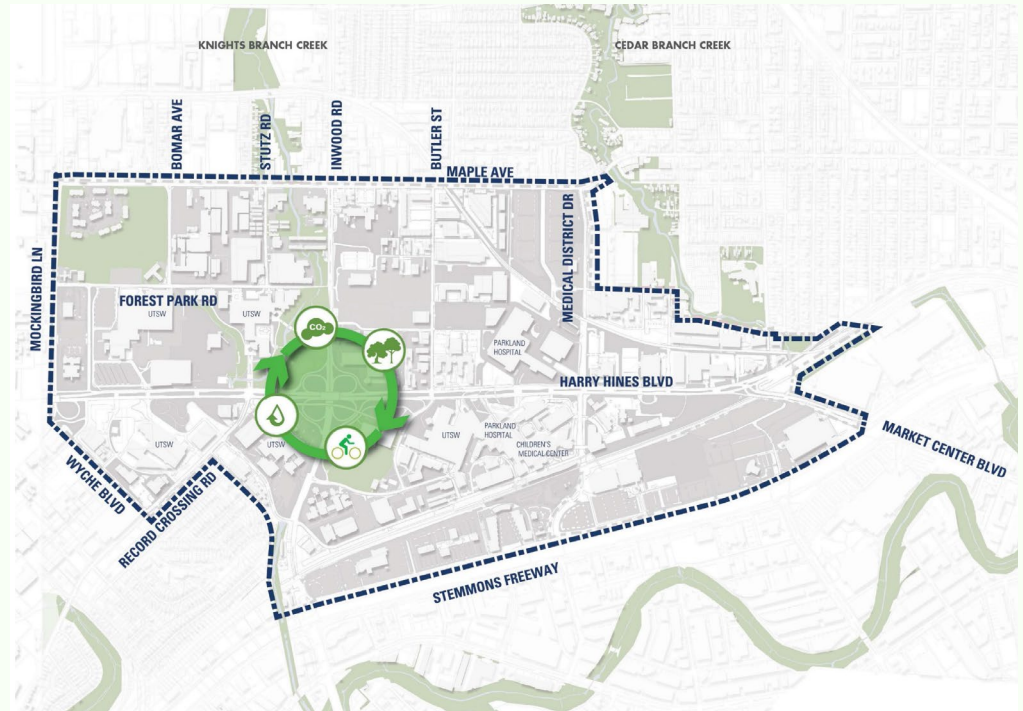
Southwest Medical District Design Framework



Green Park: Intersection of Harry Hines and Inwood

10-ACRE PARK AT THE HEART OF THE DISTRICT

- Anchor the District
- Transform an undesirable space into the nucleus
- Form the ecological center of the District
- Unite four quadrants of the District
- Create an iconic destination





Current Traffic Volumes

HARRY HINES BLVD

- 33,000 Average Daily Trips (2019)
- 35,000 - 45,000 ADT (2045)

INWOOD ROAD

- 49,000 Average Daily Trips (2019)
- 52,000 - 69,000 ADT (2045)

Majority of traffic travels through the intersection with only limited use of the interchange





Park Vision



Southwestern Medical District Vision for an Innovative, Healthy, and Safe Environment swmdtransformation.com



Project Advocates and Donors



Eugene McDermott Foundation



O'Donnell Foundation



W.W. Caruth Jr.



North Central Texas
Council of Governments



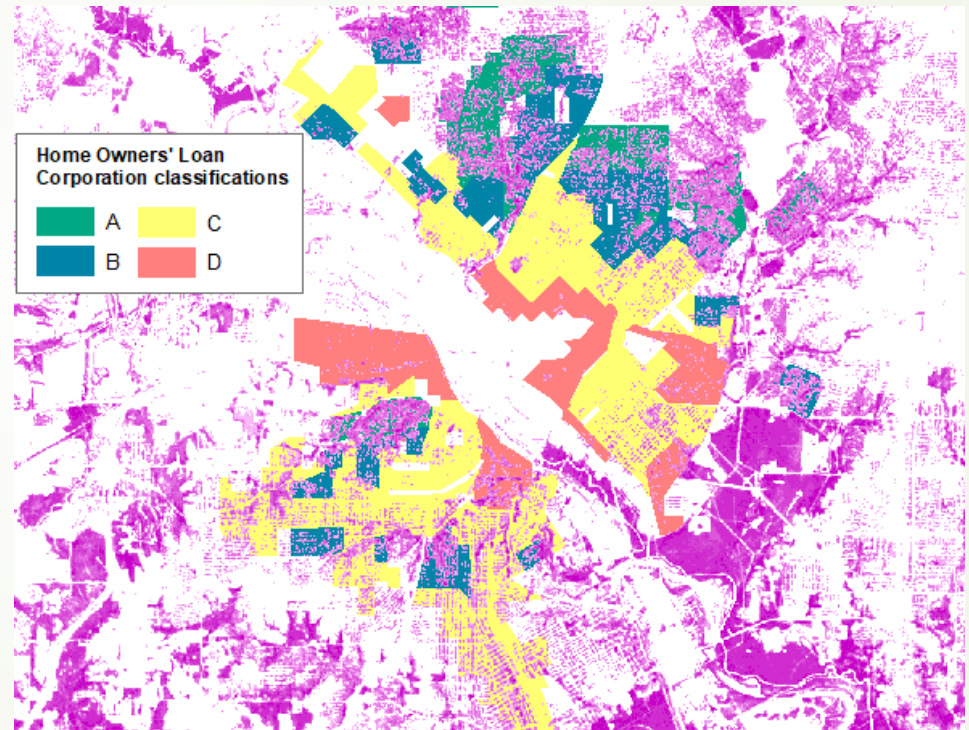
QUESTIONS?

Cheri Cuellar
cheri@texastrees.org
texastrees.org



Tree Canopy and Environmental Justice in the 12-County Region

- Racial disparities in tree canopy can be linked to redlining efforts to disinvest in communities of color.
- Nuanced inequities exist for block groups with a concentration of people of color but not for block groups with a concentration of low-income individuals.

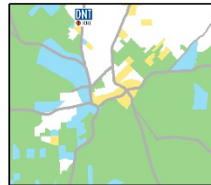


NCTCOG's Environmental Justice Index

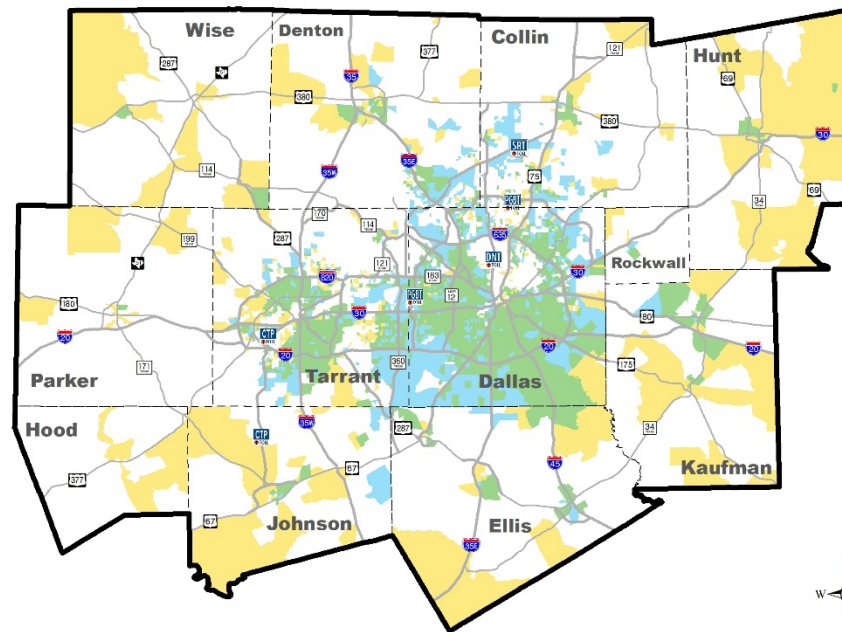
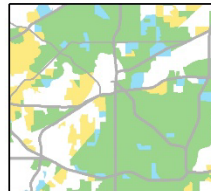
Environmental Justice Index

Central Business Districts

Dallas



Fort Worth



Legend

- Block Groups Above Regional Percentage: Low Income
- Block Groups Above Regional Percentage: Total Minority
- Block Groups Above Regional Percentage: Low Income and Total Minority

- Block Groups At or Below Regional Percentage: Low Income and Total Minority
- Counties
- Highways
- MPA Boundary

The Environmental Justice Index (EJI) displays Census block groups above the regional percentage for two variables: Total Minority and Low Income. The Total Minority population includes individuals who identify their race as any race other than white, or who identify their ethnicity as Hispanic or Latino. The Low Income population includes individuals whose household income in the past 12 months was below the approximate Department of Health and Human Services poverty threshold. The EJI is a preliminary screening tool to identify areas that may need additional analysis when considering EJ groups in a plan, project, or program.

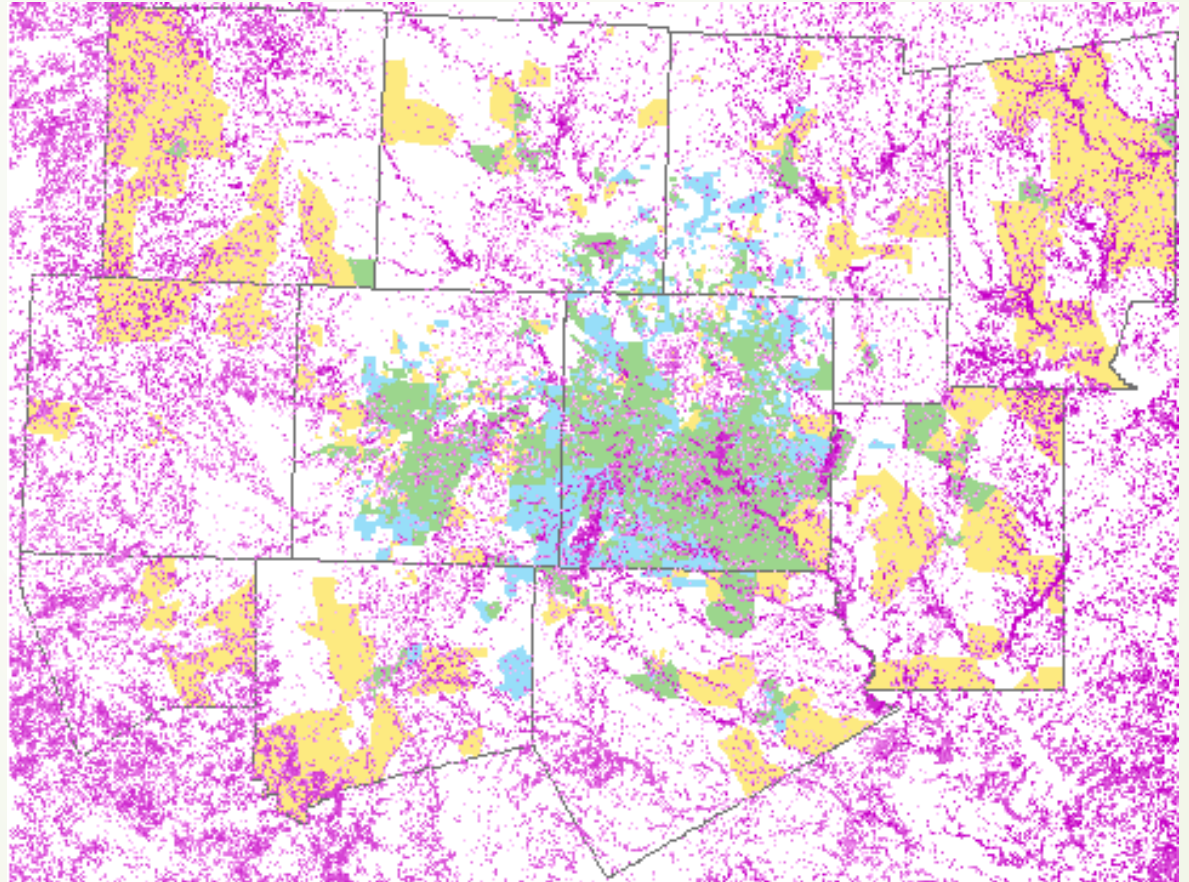
Source: 2019 American Community Survey
5-Year Estimates
January 21, 2020



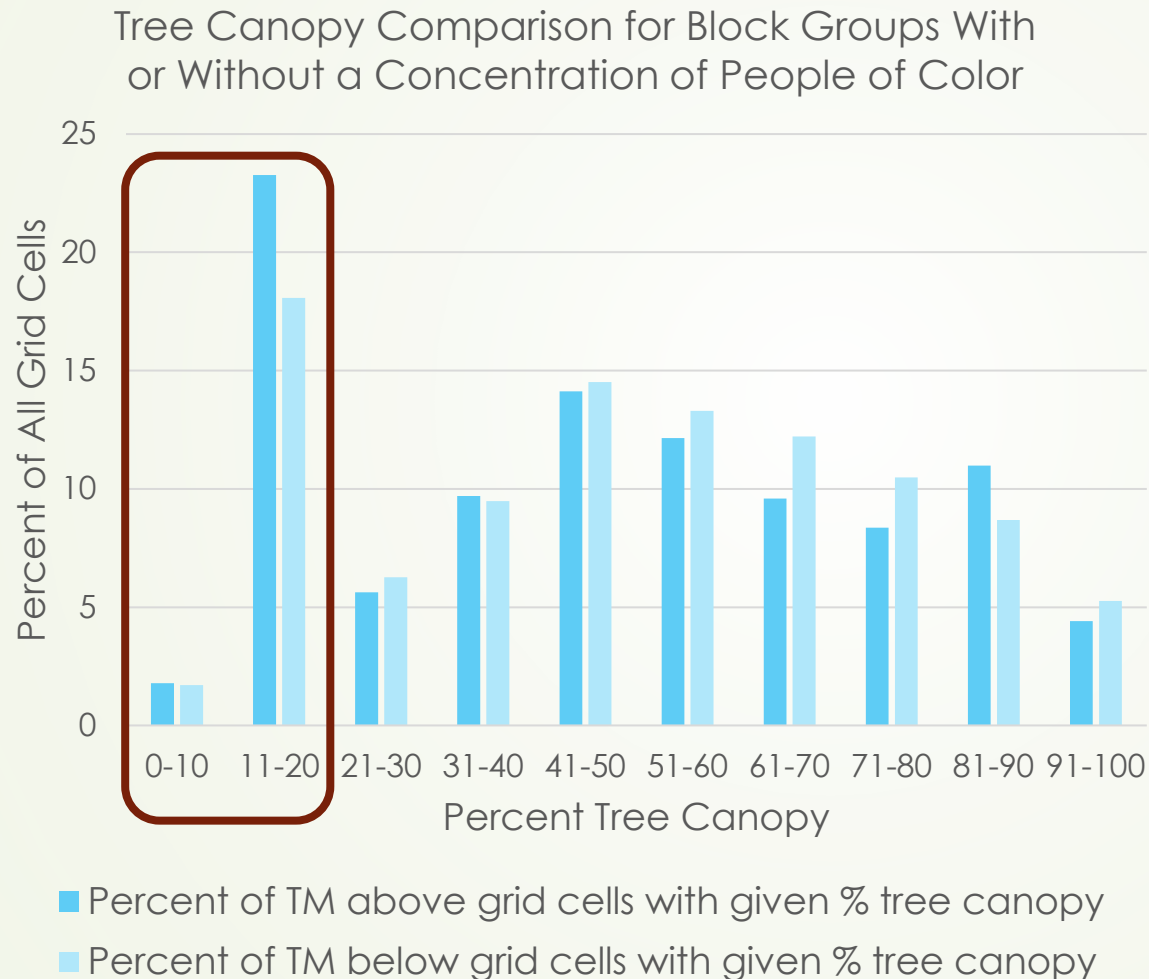
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National Land Cover Database Tree Canopy

- National Land Cover Database tree canopy contains percent tree canopy estimates for each 30m grid cell across all land covers and types.

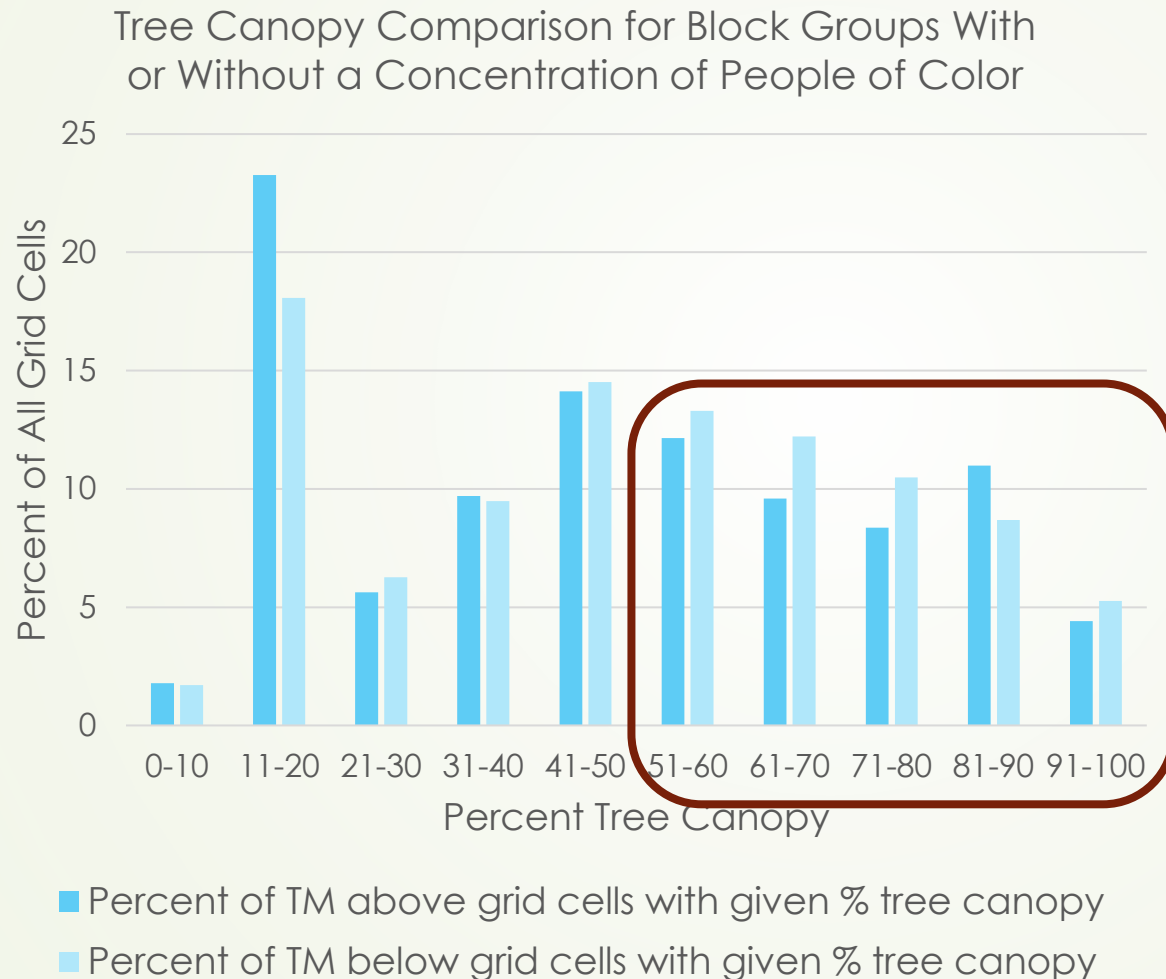


Findings: Total Minority



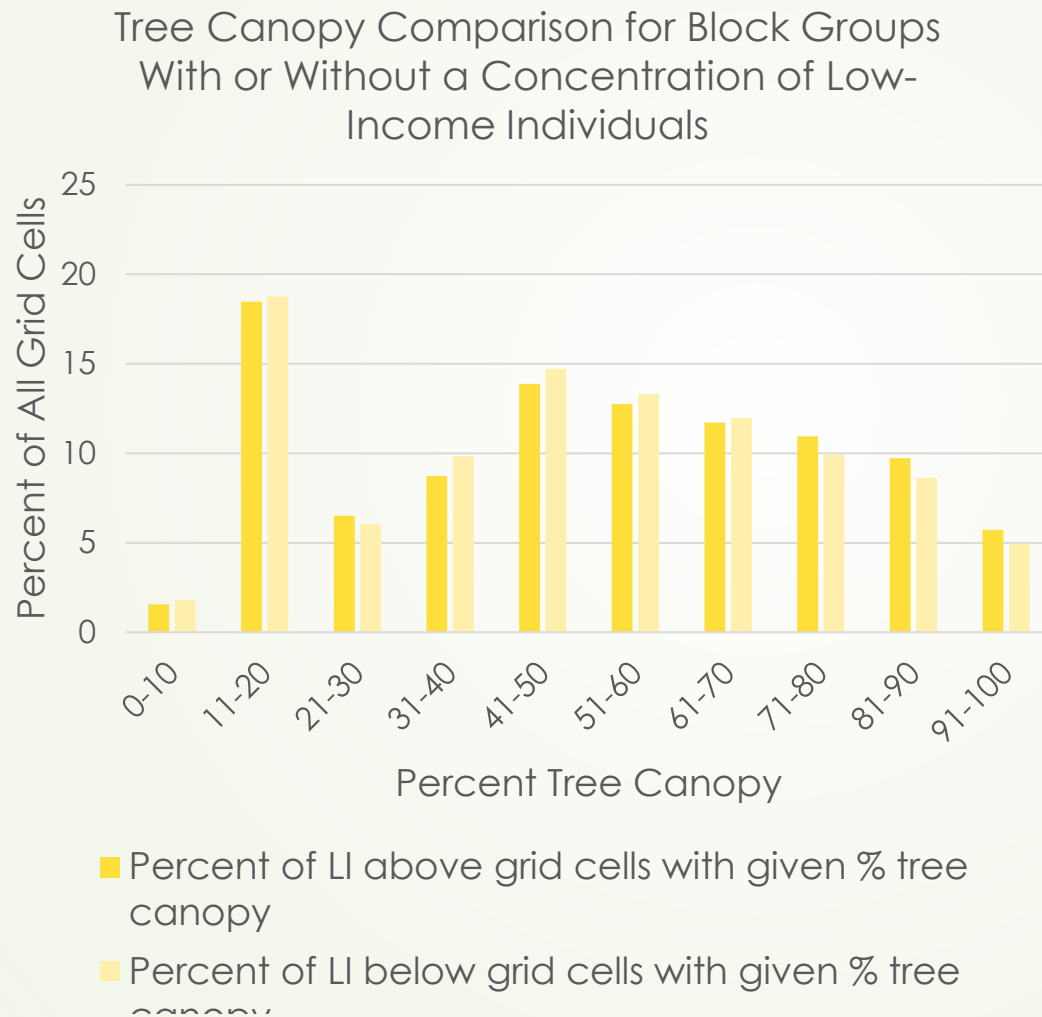
About 25 percent of grid cells in block groups with a concentration of people of color have 20 percent or less tree canopy cover, compared with about 20 percent of grid cells in block groups without a concentration of people of color.

Findings: Total Minority



About 46 percent of grid cells in block groups with a concentration of people of color have 51 percent or more tree canopy cover, compared with about 64 percent of grid cells in block groups without a concentration of people of color.

Findings: Low Income



No such pattern existed for block groups with a concentration of low-income individuals but no concentration of people of color.

Method

- Calculate number of grid cells within ranges of percent tree canopy (0-10%, 11-20%, etc.)
- Normalize as percent of all grid cells within block groups with higher vs. lower concentration of equity groups

| Percent of grid cell with tree canopy | 0-10 | 11-20 | ... | 91-100 | Total |
|------------------------------------------------------------------|--------|-----------|-----|---------|-----------|
| Number of grid cells "TM above" | 13,761 | 178,302 | | 33,838 | 766,570 |
| Number of grid cells "TM below" | 96,324 | 1,017,632 | | 296,700 | 5,633,219 |
| Percent of "TM above" grid cells with given % tree canopy | 1.80 | 23.26 | | 4.41 | |
| Percent of "TM below" grid cells with given % tree canopy | 1.71 | 18.06 | | 5.27 | |



Contact

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North Central Texas
Council of Governments
Environment & Development

Q&A Session

NOW, IT'S YOUR TURN...



Upcoming Meetings and Opportunities

- NCTCOG Regional Integration of Sustainability Efforts (RISE) Coalition Quarterly Meeting, July 22, 9:30 am via MS Teams
 - [Details here](#) or on the [RISE Coalition webpage](#)
 - Please contact Breanne Johnson at bjohnson@nctcog.org or 817-695-9148
- NCTCOG [Public Works Council Meeting](#), August 18, 9:30 am at NCTCOG Offices
- NCTCOG [Sustainable Public Rights-of-Way \(SPROW\) Meeting](#), TBD
- NCTCOG [Public Works Roundup](#), September 13, 8:30 am – 4 pm at Grapevine Convention Center
 - Please contact Erin Blackman at eblackman@nctcog.org or 817-608-2360 for more information.

Contact Connect

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