A Case for Cool Trees: Advancing Houston's Tree Equity

HARC

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Preface

This report can be used by nonprofits, neighborhood leaders, community groups, local governments, and funders seeking guidance on how to plan and conduct future tree planting efforts equitably in urban environments to reduce climate and health risks. It complements ongoing efforts to support tree canopy equity in the Houston region and was developed through three phases: DISCOVERY, RESEARCH, and SYNTHESIS.

The **DISCOVERY** phase engaged key stakeholders and community organizations to explore a series of questions related to the need for trees in Houston, including current challenges and barriers, planting efforts and resources, and knowledge gaps relevant to decision-making. These dialogues provided a foundation to design the research phase.

The **RESEARCH** phase produced high-resolution neighborhood-scale tree canopy and heat maps for a community with low existing canopy, high heat, high social vulnerability, and community-based support that was validated during the discovery phase.

The **SYNTHESIS** phase brought together discovery and research outcomes to provide local context by summarizing recommendations and alignment of future implementation opportunities with strategic actions of local tree planting initiatives in an underserved community.

Introduction

Trees infuse resilience into urban communities by mitigating extreme heat, alleviating flood risk, capturing carbon, conserving energy, improving environmental quality, and contributing to community health and wellbeing. However, trees are not evenly distributed across Houston, which means all residents do not experience the benefits they provide. This impact is particularly felt in disadvantaged communities, which often have disproportionally fewer trees and less green space (Figure 1). A solution pathway, known as **Tree Equity**, has the potential to offer substantial social and environmental health benefits by aligning the multifunctional urban tree canopy with Houstonians who need it most. Although a multitude of sustainable benefits are associated with urban tree canopy, **A Case for Cool Trees** specifically focuses on the heat mitigation potential of trees and greenspace.

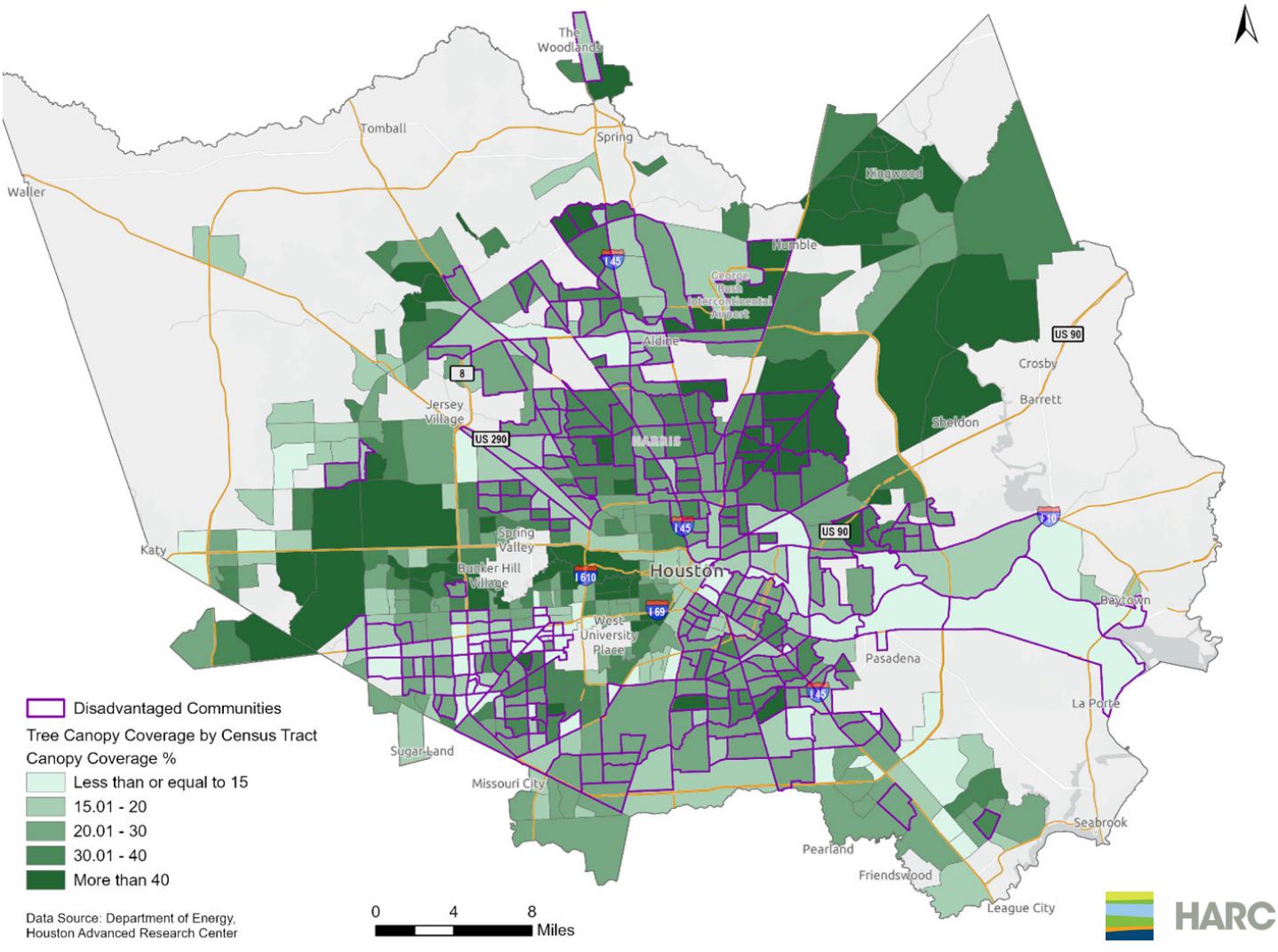


Figure 1: Percentage of tree canopy for disadvantaged (purple outline) and non-disadvantaged census tracts in the City of Houston.

Figure 2: Co-benefits such as the cooling affect provided by this tree coverage on Park Center Drive should be accessible by all Houstonians.

Tree Equity is a planning approach that prioritizes tree planting, reforestation, or urban greening projects in disadvantaged communities to equitably distribute tree canopy across a city, county, or region (Figure 2). Cities across the U.S. are applying tree equity as a planning standard to improve green space management. Equitable tree planting or reforestation projects incorporate inclusive community-driven approaches to align planning, design, and implementation with the goals and vision of the community members. Early engagement coupled with sustained community collaboration is essential to achieve long-term equitable resilience outcomes. When thoughtfully co-developed, with equity and justice aims, tree planting projects can improve community resilience by providing social, environmental, and economic co-benefits. Co-benefits include water and air purification, climate resilience, reduced environmental contamination, enhanced biodiversity (variation of living things), and green job creation. The presence of urban trees in a neighborhood promotes a sustained nearness of nature because community members can access green spaces, which improves the overall quality of life by bolstering physical health and mental wellbeing.

During the past decade, several studies have focused on extreme heat as a significant public health challenge in the Houston region. Low-income residents, those without reliable access to cooling, and the elderly are the most vulnerable to negative health impacts during the hot summer months.[1] In a 2021 study, it was estimated that more than 80 additional heat-related deaths will occur with every degree Fahrenheit (°F) of temperature increase in Harris County. Rates of mortality caused by excessive heat in the predicted future climate of 2050 are disproportionally distributed in downtown and west Houston.[2] These areas currently have a limited amount of tree canopy. Another factor that exacerbates heat-related impacts is limited nighttime cooling. This is a concern because the annual average number of warm nights (above 80°F) may increase from one night in the early 2000s, to more than 20 nights by 2050, potentially worsening heat-related impacts in urban areas.[3]

Local landscape features of urban environments affect temperature and humidity, influencing the air temperatures experienced by residents throughout the day. Areas that have more impervious cover and dark surfaces, such as concrete or asphalt roads, parking lots, sidewalks, and roofs, tend to heat up quickly and remain hot throughout the day. A 2020 heat mapping campaign provided snapshots of urban heat across neighborhoods in Harris County on a hot summer day (Figure 3).[4]

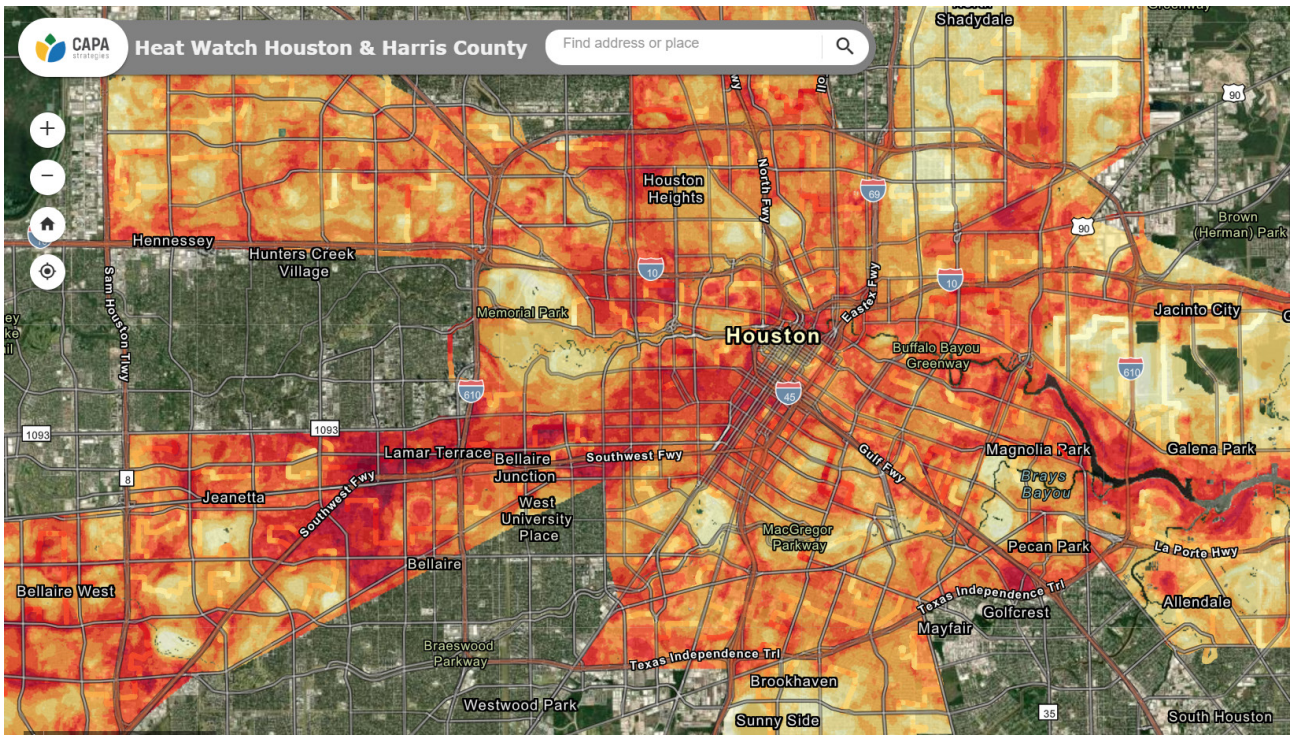


Figure 3: 2020 heat mapping campaign interactive mapping tool, featuring modeled afternoon temperature (www.h3at.org).

[1] Hayden, M.H., Wilhelmi, O.V., Banerjee, D., Greasby, T., Cavanaugh, J.L., Nepal, V., et al. (2017). Adaptive Capacity to Extreme Heat: Results from a Household Survey in Houston, Texas. Weather, Climate, and Society, 9(4), pp.787 799.

[2] Eslami, E., Jennings, M.K., Abbinett, J. and Pillai, P. (2022) 12.1 Improving Projections of Future Heat-Related Disease Burden with Climate Change in Harris County, Texas. 13th Conference on Environment and Health. American Meteorological Society. https://ams.confex.com/ams/102ANNUAL/meetingapp.cgi/Paper/395361

[3] Stoner, A. and Hayhoe, K. (2020) Climate Impact Assessment for the City of Houston. ATMOS Research & Consulting. https://www.houstontx.gov/mayor/Climate-Impact-Assessment-2020-August.pdf

[4] Houston Harris Heat Action Team (H3AT). https://www.h3at.org/.

Measured temperatures were up to 17°F warmer in some parts of the County compared to others, which points to the unequal distribution of excessive heat experienced in those neighborhoods. Warmer temperatures were concentrated in areas with dense urban development and industrial activities, as well as along major freeways. Cooler temperatures were recorded in residential neighborhoods and parks with more tree canopy and green space.

The urban tree canopy and associated green space support resilience to extreme heat by serving as a natural buffer that directly reduces land surface temperatures. Canopy cover over 40% in urban developed areas can reduce daytime temperatures significantly at the city block scale.[5] Heat risk reduction, or the prevention of heat-related illness due to the shade and cooling properties of a tree's canopy, offers a substantial economic benefit with an annual value of $910.28 per tree (Table 1).[6] An analysis of the heat-related economic value of tree canopy across 97 U.S. cities showed that tree canopy cover prevents 245 to 346 deaths, and 50,000 heat-related doctor visits, providing an estimated $1.3 to $2.9 billion annually.[7] The association of urban tree canopy with heat dissipation, especially during hot summer months, is likely to shift towards a longer seasonal cooling effect, which is beneficial for the long-term prevention of heat-related illness as climate change impacts become more severe.[8]

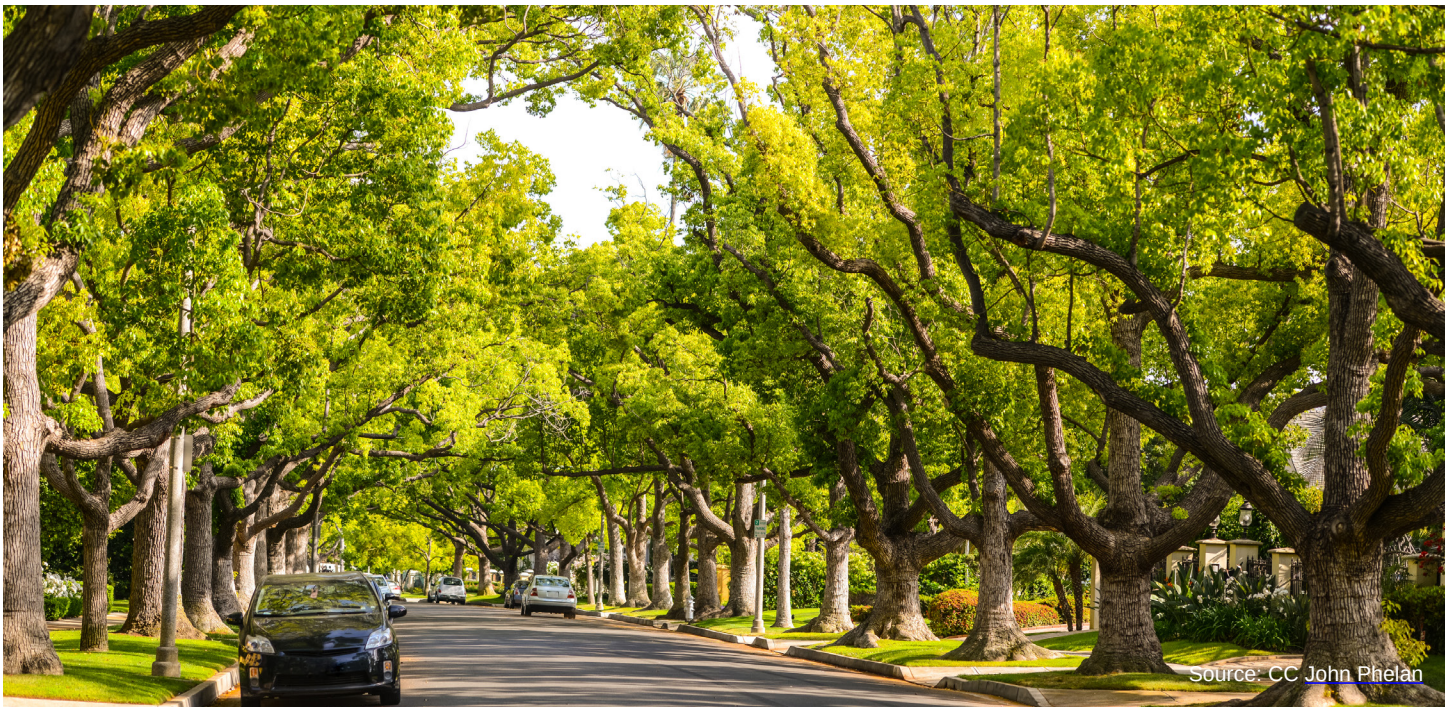
In recognition of these benefits, the City of Houston established a community-wide goal to plant 4.6 million native trees by 2030, creating a path forward for climate-resilient communities.

Table 1: Economic Benefits of Urban Trees[6]

Urban Tree Benefits	Annual Dollars per Tree (2021 USD)	
Heat Risk Reduction	$	910.28
Property Value Increase	$	53.15
Habitat	$	40.18
Stormwater Volume and Quality	$	20.17
Building Energy Savings	$	17.05
Carbon Sequestration and Avoided Emissions	$	6.33
Drought Risk Reduction	$	5.53
Air Quality Improvement	$	2.50

[5] Ziter, C. D., Pedersen, E. J., Kucharik, C. J., and Turner, M. G. (2019). Scale-dependent interactions between tree canopy cover and impervious surfaces reduce daytime urban heat during summer. Proceedings of the National Academy of Sciences, 116(15), 7575–7580.
[6] FEMA, FEMA Economic Benefit Values for Green Infrastructure, July 2022 https://www.fema.gov/sites/default/files/documents/fema_economic-benefit-values-green-infrastructure.pdf
[7] McDonald, R.I., Kroeger, T., Zhang, P. and Hamel, P. (2020). The Value of US Urban Tree Cover for Reducing Heat-Related Health Impacts and Electricity Consumption. Ecosystems, 23, 137-150. https://doi.org/10.1007/s10021-019-00395-5.
[8] Greene, C.S. and Millward, A. (2017). Getting closure: The role of urban forest canopy density in moderating summer surface temperatures in a large city. Urban Ecosystems, 20, 141-156.

Tree Equity Examples

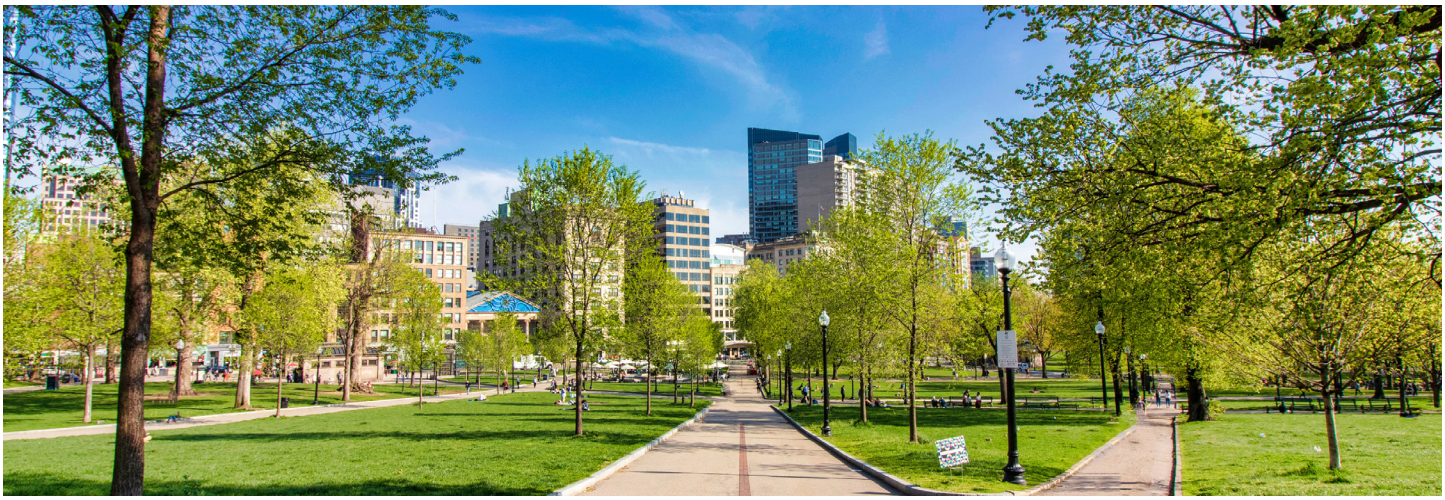


The **Los Angeles** Urban Center published a report that highlights areas ready for immediate plantings through a tiered system that ranks highly paved areas lowest because these locations require extensive preparation before trees can be planted. This strategy, when paired with co-ownership of planting projects and equitable financing, was recommended to improve tree equity in the city.

Holyoke, Massachusetts has an Urban Forest Equity Plan centered around engagement, planning, and management. Proactive management, meaning building a resilient urban forest rather than reacting to a disaster, is ideal. However, a city may not be ready to be proactive, and conditions need to be improved first by removing or replacing trees and repairing sidewalks and streets.

Chicago, Illinois announced a tree equity initiative in 2022 called "Our Roots Chicago", which focuses on increasing tree canopy in neighborhoods with low existing cover. Through this program, the city plans to plant 75,000 trees over the next five years, mainly in traditionally underserved neighborhoods.

In **Arlington, Virginia**, EcoAction Arlington's Tree Canopy Equity Program is focused on fundraising to plant trees on private property for free. The goal is to increase tree cover in 10 neighborhoods from the current 17-33% to approximately 40%.



Boston, Massachusetts produced and released its urban forest plan in 2022 after determining a previously redlined neighborhood had 10% tree cover, compared to an average of 26% citywide. This project prioritized community engagement, with community members identifying their needs and placing students as local stewards to support tree establishment after planting.

Four Key Components of Equitable Tree Plantings

This section summarizes key takeaways from interviews with tree planting and community organizations that occurred during the discovery phase, along with recommendations and resources for supporting Tree Equity. Interviewed tree planting organizations include state and local governmental agencies and environmental nonprofits that have a planting program, are involved in community tree plantings, or are conservation minded. Community organizations consisted of neighborhood groups, local nonprofits, or grassroots groups with a mission to improve community health.

Four key components of Equitable Tree Plantings were formalized based on the interviews:

1. Consideration for extreme heat, low tree canopy, and disadvantaged communities
2. Funding for watering and maintenance
3. Community engagement and stewardship
4. Coordination and collaboration

1 Consideration for Extreme Heat, Low Tree Canopy, and Disadvantaged Communities

Tree Equity can be addressed on a city or neighborhood scale. At both scales, mapping tools and community engagement should be combined during an initial phase to screen potential locations where tree planting projects would be beneficial. Publicly available free resources such as the 2020 Urban Heat Island Mapping Campaign project, American Forest's Tree Equity Score tool, ESRI's Heat Resilience Index Map, Climate and Economic Justice Screening Tool (CEJST), and A Vegetative View: Harris County contain data and information to identify priority tree planting areas depending on a variety of criteria. For example, nine potential priority tree planting areas within the City of Houston were identified based on census tracts with the highest average morning temperatures and lowest percentage of tree canopy coverage that are also classified as disadvantaged (CEJST) (Figure 4). These areas are illustrative of potential communities where tree plantings would be beneficial but further local support and engagement are suggested prior to implementation (a tenth sparsely populated ship channel census tract was excluded).

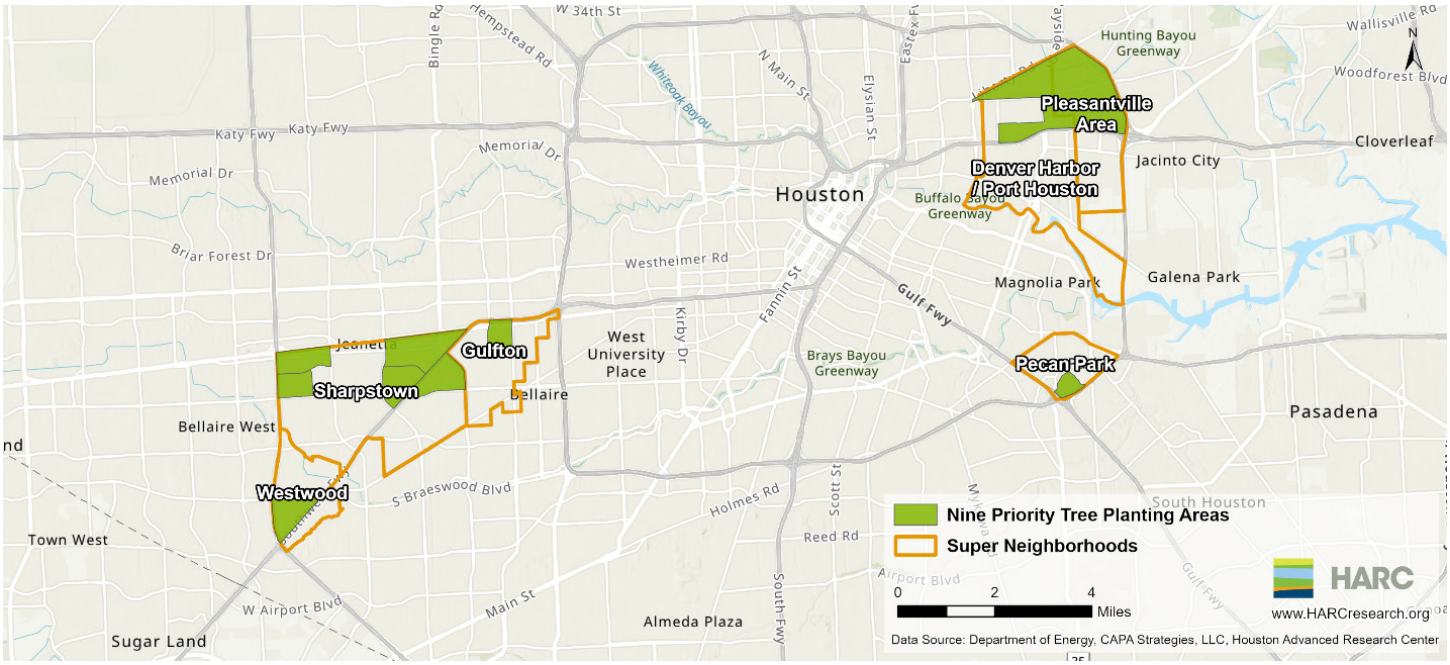


Figure 4: Nine potential priority tree planting areas representing disadvantaged census tracts with the highest average morning temperatures and lowest percentage of tree canopy coverage.

A community qualifies as "disadvantaged" according to the CEJST Tool if the census tract is above the threshold for one or more environmental or climate indicators and exceeds the threshold for socioeconomic indicators.[9] If tree planting projects are scoped from a city-wide perspective, average temperature values can be useful to quickly identify which communities are warmest. However, if one community is cooler on average compared to another, localized hot spots may be present. While afternoon temperatures capture the maximum and most extreme level of heat exposure within a day, nighttime temperatures are the main environmental driver of heat-related health issues because internal body temperatures are not able to "reset" and recover from scorching daytime highs when temperatures stay above 80°F overnight. Understanding where limited overnight cooling occurs is especially important in areas that have higher morning temperatures (Figure 5). The amount of tree canopy is another factor to consider when screening potential planting locations at the city scale. A series of tree canopy layers summarized by census tract are publicly accessible through the A Vegetative View: Harris County mapping application to enable large scale assessments and identify tree canopy gaps.

[9] Council on Environmental Quality CEJST; https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5

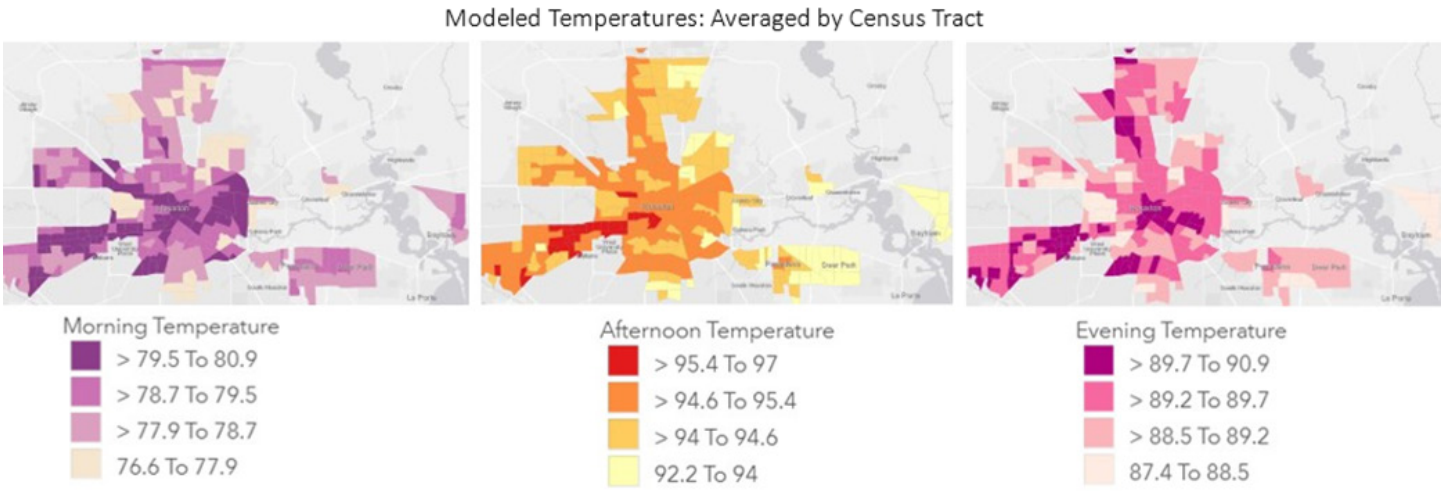


Figure 5: Modeled temperatures from the 2020 Heat Mapping Campaign (H3AT), averaged within census tracts in the study area, for three time periods: Morning (6-7 AM), Afternoon (3-4 PM), and Evening (7-8 PM).

At the community scale, high-resolution maps, such as those resulting from the 2020 heat mapping campaign[10] and the Light Detection and Ranging (LiDAR) tree canopy coverage[11], provide screening level information. These resources can be incorporated into an initial planning phase conducted in partnership with residents, community leaders, and other relevant stakeholders to identify where high heat and low tree canopy occur within a neighborhood. Once these priority tree planting areas are identified, community leaders and other stakeholders should continue to be involved in the identification of specific parks, schools, esplanades, or other public spaces where an increased tree canopy is desired.

Although these tools can help to narrow planting projects from the city to neighborhood scale by supporting initial assessments of where tree planting projects could be located, additional data can be advantageous. Furthermore, community engagement and on the ground site assessments are needed to determine which locations within neighborhoods are “ready” for tree plantings. This involves investigating ownership and intended use of specific properties. Potential planting sites must be accessible, not have plans for development or construction, and have community stewards or partners willing to participate in implementation.

Getting the Most Heat Relief Out of Trees

Areas of excessive heat can be managed at the community scale to generate increased shade coverage and a stronger associated cooling effect to mitigate the urban heat island.

Tips to get the most out of a heat-related tree planting project:

- Design tree plantings to establish a varied and well-structured high-quality canopy.
- Design for canopy quality in addition to the total coverage, i.e., area or number of trees planted.
- Incorporate a varied selection of tree species based on size at maturity to create a healthy well-structured and dense canopy, i.e., understory, subcanopy, and canopy layers.
- Use a diverse mix of native tree species selected to maximize reductions in heat. For example, the American Sycamore, Slippery Elm, and American Elm have a high potential to reduce the urban heat island effect.[12]

[10] http://www.h3at.org/
[11] A Vegetative View: Harris County
[12] Hopkins, L. P., D. J. January-Bevers, E. K. Caton and L. A. Campos (2021). “A simple tree planting framework to improve climate, air pollution, health, and urban heat in vulnerable locations using non-traditional partners.” Plants People Planet 4: 243-257.

2 Funding for Watering and Maintenance

All interviews highlighted watering and maintenance as the highest cost and most important success factors associated with tree planting projects. The burden of watering and maintaining the trees should not be placed on residents from the local community unless community stewards are willing to perform these duties and have been provided adequate resources. Allowing poorly maintained trees to create hazardous conditions or negatively affect the aesthetics of the surrounding community is an equity concern. Ideally, the planting organization should be able to accommodate two years of watering to support tree establishment, an increased survival rate, and the long-term health of the trees after planting. Watering and maintenance expenses should be disclosed to potential funders or incorporated into a project budget to improve the likelihood that funding is secured for these activities.

The cost required to water trees can be a significant portion of the planting budget and is a limiting factor that determines the number of trees organizations can plant. Watering is costly even with access to a watering truck, which can be challenging for community tree planting projects. It is not recommended to rely on volunteers for watering and long-term maintenance. Instead, arrangements should be made for these tasks with a local governmental collaborator or other public entity. Another alternative is to co-develop a plan with the community for interested residents to perform these activities with appropriate compensation. To reduce the effort required and increase the time between waterings, several techniques are available such as water collars or water-absorbing polymers (hydrogels), which have been utilized for tree planting projects, but some tree planting organizations think these methods require additional testing.

3 Community Engagement and Stewardship

Overall, local leaders were found to be passionate about improving their community's tree canopy. Planning for plantings can be aided by assessing a community's readiness for trees and considering accessibility for equipment, tree maintenance requirements, and land ownership. Houston's tree planting season generally runs from November to March when temperatures are mild, seasonal rainfall is adequate to meet water demands, and trees have as much time as possible to establish before the summer season. Ideally, planning for a tree planting project will start at least one year in advance, but organizations stated this timeline was a luxury because it is possible to plan a planting project in six months. Tree planting organizations rely on strong project management skills to keep costs low.

Figure 6: Volunteers join a community tree planting in South Houston.

Community organizations feel confident about organizing volunteers and getting trees in the ground, with one neighborhood group planting around 1,000 trees per planting season. Community members often volunteer to complete tree planting projects (Figure 6).

Fundraising covers additional expenses, such as the purchasing of trees, materials, and other contractual costs. When private partners or corporations intend to collaborate with a community to plant trees, a stipend to compensate community stewards for the time required to establish trees and perform maintenance should be included in budgeting during the early phases of planning. Tree survival and ecosystem service benefits can improve if there are interested members of the community to oversee maintenance.

Community groups should be engaged from the outset because they understand local trends, are aware of residents' interest in specific trees, and are familiar with ideal places to plant. When choosing planting locations, communities may focus on access to green space for residents and neighborhood beautification. Another general suggestion shared by a community organization was to plant trees near bus stops, which often lack adequate shade and are in direct sunlight. Also, while industrial areas have higher exposure to pollution and heat, some planting organizations have found that community members prefer trees planted near their homes. The interviewees expressed concern that projects funded by a corporate partner often result in tree plantings in locations where the sponsor's employees have access to the green space, but not necessarily residents of the community. Additional outreach or open forums are suggested for tree planting projects sponsored by a corporate partner so that the community's questions and concerns can be addressed. When choosing locations, the tree planting organizations stated they often look for schools and parks to plant because these public places are sites that provide the most benefits to the surrounding communities.

When determining locations for planting trees, interviewees shared that heat equity can often be an afterthought. The heat island effect is perceived by community groups as a large-scale regional issue that is difficult for them to address at the local level. One community organization shared that they have not always thought about heat-related health effects, but they know some neighborhoods are hot spots. Heat mitigation is an understood benefit of urban trees, but community-scale cooling effects, beyond shade from individual trees, may not be the primary motivation for planting projects. Environmental justice organizations have a strong role to play as collaborators to guide community tree planting projects from an equity perspective.

One major point of interest for community groups is planting on esplanades because of the greater amount of maintenance mowing required for grass compared to trees. If trees are desired as streetscape improvements to provide shade for roads, sidewalks, and bayou trails, a "linear forest" approach may be possible if permitting, safety regulations, and other easement requirements are met. On esplanades too narrow for trees, others suggest the installation of native prairie grasses to reduce maintenance and energy costs. Reforestation, which is a strategy of planting trees close together to create natural shade, can also help reduce maintenance mowing requirements, but it may appear to be less manicured than community members prefer. Because of the aesthetic, some community organizations may choose to plant with the goal of achieving a manicured park-like design.

Obtaining input from community organizations and city agencies like the City of Houston Planning & Development and the Houston Parks and Recreation Department (HPARD) can help identify where there is community support for tree planting programs. Community members and planting organizations agreed that residents are very interested in plantings and will happily take any free tree. However, community partners acknowledged that planting was previously

based on getting any native tree in the ground. Now, there is an increased focus on ecosystem services. The City of Houston has developed native tree lists[13], which include trees that are low maintenance and maximize ecosystem benefits. The lists include tree species that can be planted in specific types of locations (right-of-way, parks, parking lots, natural areas, etc.). But the availability of those trees, site characteristics, and community input can affect which trees are incorporated into the final planting project.

When selecting tree species, community engagement and outreach may help to highlight the benefits of planting a variety of trees, even for species that possess undesirable traits. For example, sweetgums are ideal candidates for tree planting projects due to their resilience and ability to thrive in various soil types, but residents may not want them to be planted due to their spiky seedpods. Eastern redbud is popular as an ornamental, and other commonly used trees include American sycamore, Drummond red maple, yaupon holly, and pecan. Bald cypress is often desired for tree giveaways but may grow slower than some of the commonly planted species. Crepe myrtles, a non-native ornamental, should be avoided because they are considered by some organizations and residents to be "overplanted" and have issues like bark scale and mold. The tree planting groups interviewed acknowledged that Houston's climate is well suited to growing a variety of trees.

The costs of trees are often based on demand and the desired size and species. Extended lead times along with access to nurseries can help to manage costs, which increases accessibility for community-based planting projects. Nursery space can help reduce the cost of purchasing trees because trees can be grown from less expensive seedlings, or surplus trees can be stored when purchase prices are low. For a planting project, the least expensive trees, which are often live oaks, will usually be chosen. However, it is important to have access to a variety of lower cost native tree options to support biodiversity in community planting projects. There is also increased interest in fruit trees, particularly Mexican plum and persimmon, which if planted can help to alleviate nutritional deficiencies in areas that are food deserts.

[13] Houston Parks and Recreation Department. Natural Resources & Nature Preserves. https://www.houstontx.gov/parks/naturalresources.html

4 Coordination and Collaboration

Collaboration between groups is a challenge, and the duplication of efforts is a concern among several of the groups interviewed. The City of Houston's online portal to track locations of tree plantings[14] documents collaborative tree planting projects by including information about the landowner and the leaders. More information about the tree tracking portal is included in the Featured Resources section of this report. Interviewees highlighted the strengths of different organizations in project management and execution of tree planting projects, the value of establishing tree nurseries, and the importance of prioritizing funding for tree watering and maintenance.

Community leaders acknowledged it is difficult to know where to start if they want to plant trees. If there is a desire to plant in the public right-of-way or somewhere that is not private property, the appropriate entity can be contacted to obtain information on their specific review and approval process.

To request permission for planting trees in City of Houston parks and right-of-way, community members can submit planting requests via email to ForestryPlanReview@houstontx.gov.

Harris County Flood Control District has detailed its process online about how to plant trees on their rights-of-way, as well as tree planting volunteering information.[15]

Trees For Houston welcomes public input for future right-of-way plantings and offers support to those who may not have funds or the ability to facilitate their volunteer projects.[16]

Basic information to prepare when requesting approval to plant trees on public property:

- Address or block range of the planting site
- Planting location of each proposed tree
- Gallon size of each proposed tree
- Species of each proposed tree
- Watering source for each proposed tree (for two summers)
- Map or photo documenting planting locations

[14] https://pg-cloud.com/HoustonTX/.
[15] https://www.hcfcd.org/Activity/Maintenance-Programs/Tree-Planting-Program
[16] https://www.treesforhouston.org/street-trees

Case Study: Alief

Alief is an ethnically diverse and highly urbanized neighborhood in Southwest Houston that is defined as a disadvantaged community by the CEJST tool. Alief has warmer than average afternoon temperatures compared to other communities in the Houston region, and contains multiple areas of excessive heat with concentrated temperatures upwards of 10°F warmer than nearby locations (h3at.org). The neighborhood only has 20% tree canopy coverage,[17] and maintains a tree equity score that is less than 80 out of 100, indicating that additional trees are needed.[18] In addition, the ESRI Climate Solutions Map showed that planting trees in Alief would generate a moderate to high amount of benefits towards improving urban heat health.[19] The Alief Westwood Complete Communities Action Plan includes a goal of planting 100 trees by 2025.[20] The Super Neighborhood Council shares a vision with the community members to exceed this goal.

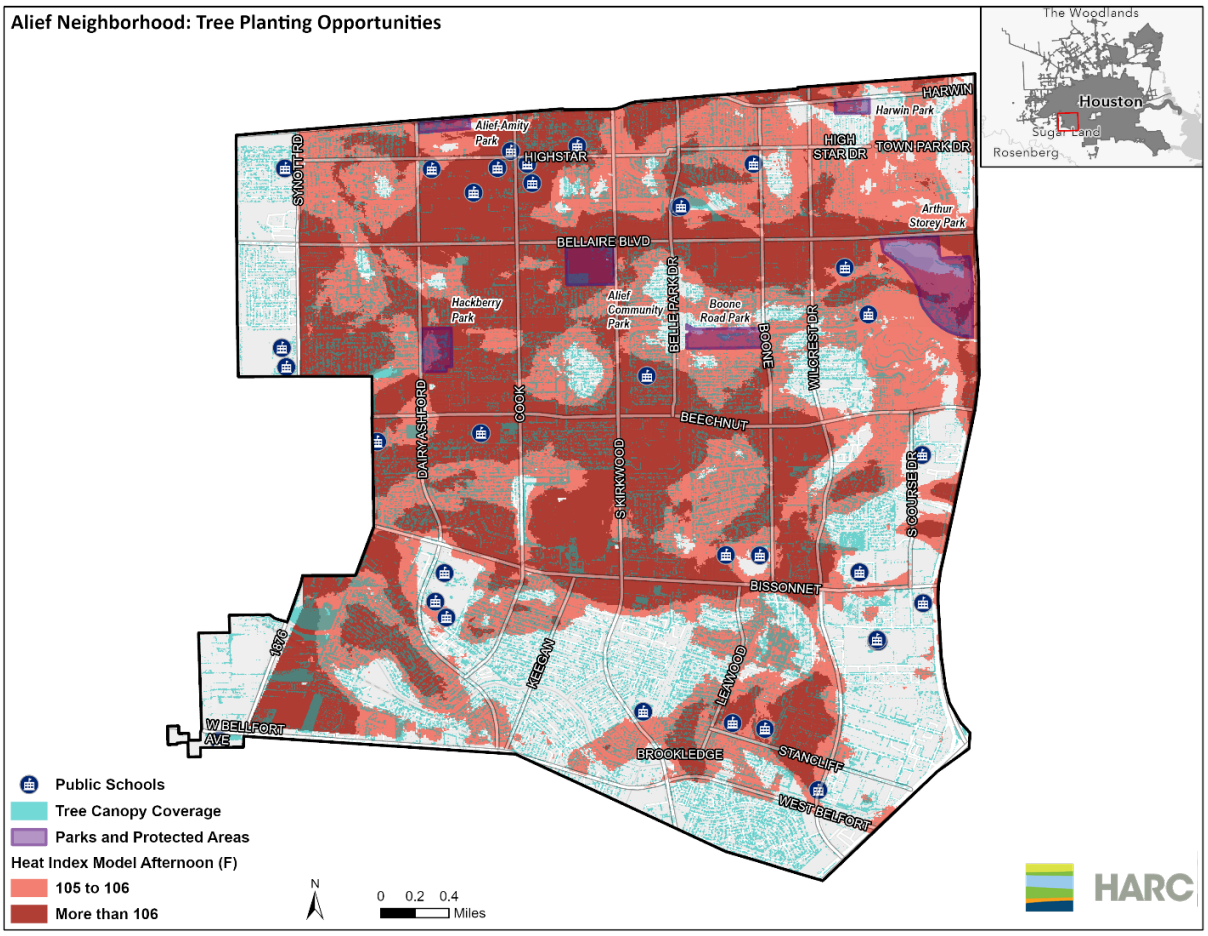


Figure 7: A community scale example showing areas of excessive heat and tree canopy coverage in the Alief neighborhood.

[17] A Vegetative View: Harris County

[18] Tree Equity Score, American Forests; https://treeequityscore.org/map/#10.8/29.7104/-95.5789

[19] ESRI; https://www.arcgis.com/home/item.html?id=2adfc2a8a552469c8df2b3fa859e7bbe

[20] "Alief Westwood Complete Communities Action Plan." 2020. https://cms7files.revize.com/ldrhoustoncctx/Our%20Communities/Alief%20Westwood%20CC-A_ActionPlan.pdf

Table 2: Alief Community Profile (2019)[21, 22]

Population	112,672
Population density (people per square mile)	7,698
Hispanic population	51%
Non-Hispanic Black population	23%
Non-Hispanic Asian population	19%
Median household income	$42,921
Residents with income less than $50,000	60%
Homeowner rate	51%
Median housing value	$117,044

The project team engaged the Alief Super Neighborhood President to learn more about community priorities and identify beneficial tree planting locations. The Alief community has an extensive history of tree planting efforts that spans 20 years. In the past, planting projects have successfully added trees to the community. However, gaps in tree canopy coverage along three major boulevards, Bellaire, Beechnut, and Bissonet, as well as cross streets such as Wilcrest Drive, were identified (Figure 8). These major thoroughfares were highlighted as priority tree planting areas because many community members walk and use public transportation along these routes where they are potentially exposed to excessive heat. In addition, residents desire more linear plantings along these esplanades. These areas could be prioritized for tree planting projects due to the heat health risk reduction benefit. These tree planting opportunity areas were also highlighted by mapping the tree canopy coverage and modeled afternoon heat index (Figure 7). The map shows areas in Alief with low tree canopy coverage and high heat index (i.e., hot spots), which are locations with afternoon heat index values over 105°F.

While planting along esplanades can reduce heat exposure and prevent-health impacts to residents walking along the roadways, there are areas adjacent to these corridors where more tree planting space is available. Public areas, such as the schools along Bellaire and Beechnut and Arthur Storey, Hackberry, and Boone Road parks, are also hotspots in the neighborhood that would benefit from increased canopy coverage (Figure 7). If trees are planted in these areas, residents would have access to the shade and cooler temperatures that result from a more expansive tree canopy.

These maps are examples of information that can be used as a starting point to identify potential locations where tree planting projects may benefit the community the most, but they are intended to be used for preliminary planning purposes only. Further, on the ground site assessments and community engagement are required before conducting tree planting projects to validate the data and ensure that the areas identified are suitable to support trees.

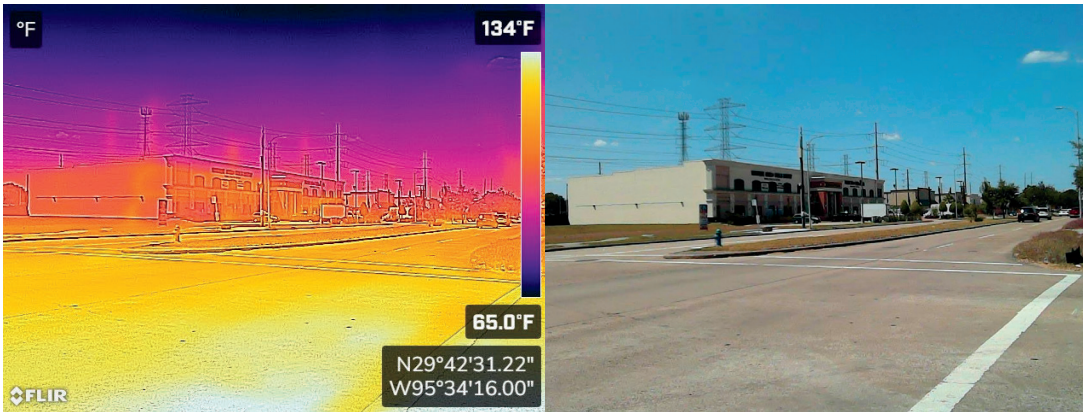


Figure 8: Esplanade in Alief without tree canopy showing peak afternoon surface temperatures in August (ambient air temperature 102°F).

[21] "Alief Complete Community Data Snapshot." 2019. https://cms7files.revize.com/ldrhoustoncctx/Our%20Communities/Alief-Westwood/data/Data%20Snapshot%20CC2-Alief-Data%20Snapshot_08_29_19.pdf

[22] "Alief Super Neighborhood Resource Assessment." 2021. City of Houston Planning & Development Department. https://www.houstontx.gov/planning/Demographics/2019%20Council%20District%20Profiles/Alief_Final.pdf

Featured Resources

City of Houston Tree Planting Portal

The City of Houston recently launched a Tree Planting Portal[23] in April 2023, to begin tracking tree planting locations for the 4.6 million tree planting goal established in Resilient Houston and the Houston Climate Action Plan (Figure 9). City departments, partners, and individuals can identify where trees have already been planted, as well as new locations to plant trees, by referencing the Tree Equity Score and urban heat island map layers. The portal captures and displays information about each tree, including the type of planting, type of landowner, and planting project leader. Users can upload locations where they have planted trees along with species information to participate in tracking how equitably trees are planted throughout the city.

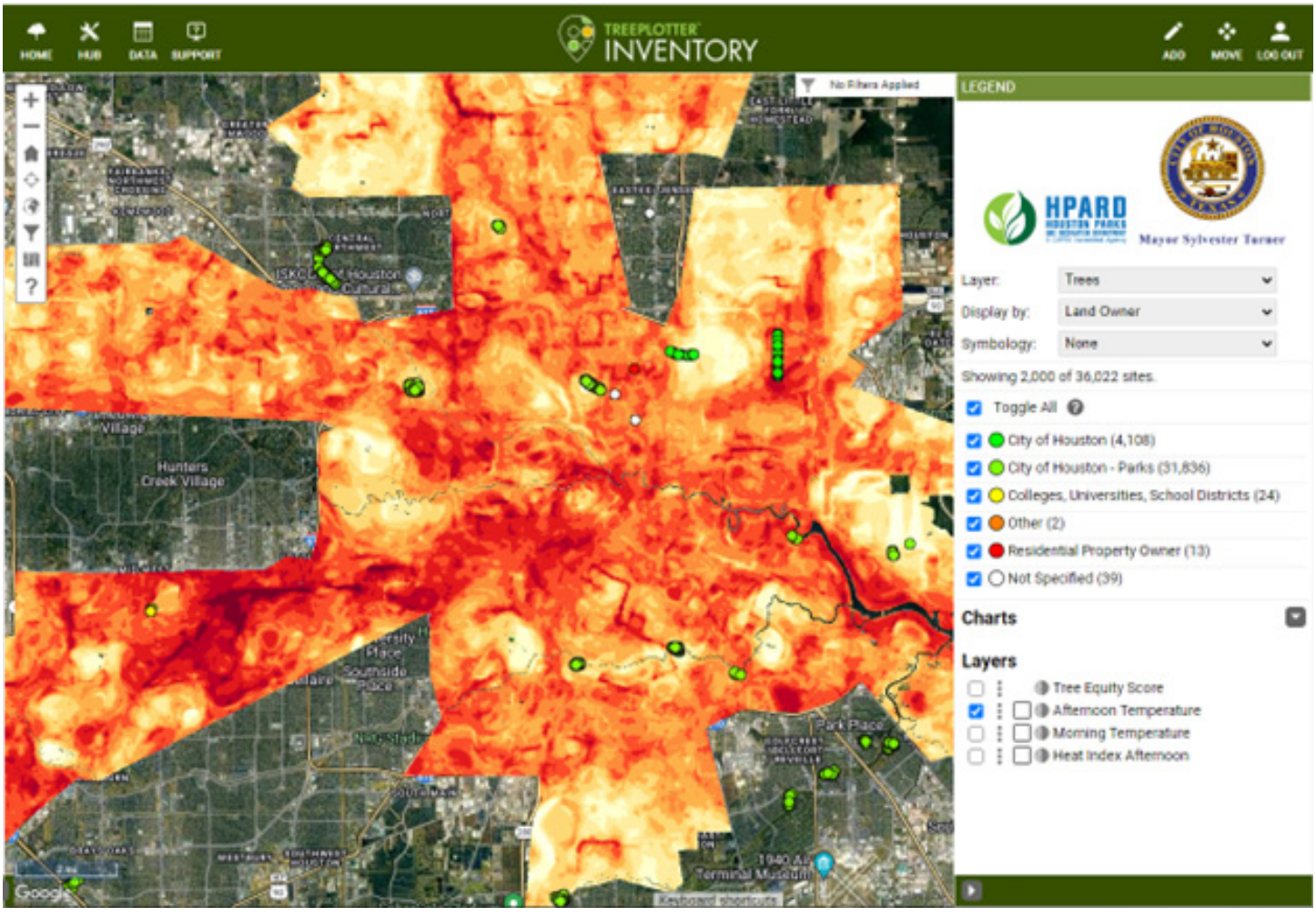


Figure 9: Houston Parks and Recreation Department's Tree Tracking Portal (https://pg-cloud.com/HoustonTX/). In this example, the color of the dot illustrates different categories of landowner (City of Houston-green; Colleges, Universities, School Districts-yellow; Other-orange; Residential Property Owner-red; and Not Specified-white).

[23] TREEPLOTTER INVENTORY. https://pg-cloud.com/HoustonTX/.

City of Houston Native Tree List

The City of Houston will only approve trees from a specific list of species that are native to the Houston Area for planting projects on city property and in the right-of-way. Planting native species ensures that the trees are well-adapted to local conditions (https://www.houstontx.gov/parks/naturalresources.html).

- Right-of-Way Tree List
- Park Tree List
- Parking Lot Tree List
- Natural Area Tree List
- Protected Trees Master List

Texas Forest Service Green Futures Program

A new corporate sustainability sponsorship initiative, Texas Forest Service's Green Futures Program, is a collaborative, scalable program centering community needs in the planning process. Corporate donors are connected to local nonprofit organizations to address global issues and social responsibility through investment in people, community, and trees. In this partnership, the Forest Service aims to align corporate goals with heat needs and ecosystem service benefits. Green Futures has been successful in completing five tree planting projects by early 2023. For example, 600 trees were planted, and 500 seedlings given away in the Kashmere Gardens neighborhood in February of 2023 (https://tfsweb.tamu.edu/kglovestrees/).

Trees for Houston

Trees for Houston is a non-profit organization that is dedicated to planting, protecting, and promoting trees. This organization can provide project management and tree acquisition support, and hosts monthly tree giveaways during the planting season. Houston area school campuses are also eligible for the Trees for Schools program through which Trees for Houston not only coordinates tree plantings but also maintains and monitors the trees that were planted for two years. Through the Neighborhood Fund, community members can donate to support planting trees in their neighborhood. With a focus on ensuring that trees survive and are suitable for the area in which they are planted, Trees for Houston provides a Master Species List of the types of trees that the organization typically plants and distributes. There are also instructional videos and guides on how to properly plant and maintain trees on the Trees for Houston website.[24]

- Tree Giveaways
- Tree Requests
- Trees for Schools
- Neighborhood Fund
- Master Species List
- Tree Planting Instructions

[24] Trees For Houston. https://www.treesforhouston.org/

Houston-Galveston Area Council

Through its Urban Forestry Program, the Houston-Galveston Area Council (H-GAC) supports the integration of urban forestry data into local planning efforts. The goal of this program is to improve the health and diversity of urban forests and increase public awareness of the benefits of urban trees in the region. H-GAC also provides several Regional Planning resources on urban forestry in the Houston-Galveston region, including instructions on how to care for trees during droughts.[25]

To support local governments and their partners, H-GAC provides a catalog of conservation practices and policies, potential partner organizations and funding mechanisms, and outreach tools through the Regional Conservation Toolbox.[26]

- Urban Forestry Program
- Caring for Trees During Drought
- Regional Conservation Toolbox

Harris County Master Gardeners

The Harris County Master Gardeners program is a service of Texas A&M AgriLife Extension, which has been active since the late 1970s. Currently, there are about 200 Master Gardeners with the shared goal of providing horticultural knowledge and educational outreach. Though this group does not lead regular tree plantings,

[25] Houston-Galveston Area Council. Urban Forestry. https://www.h-gac.com/urban-forestry
[26] Houston-Galveston Area Council. Regional Conservation Toolbox. https://www.h-gac.com/regional-conservation/toolbox

the focus on education gives the organization a strong understanding of community needs and interests related to trees. This insight into educational needs in connection to tree planting can be helpful when sourcing trees, working based on community interests, and maintaining planted trees.

- Ask a Master Gardener

Texas Department of Transportation

Through its Green Ribbon Landscape Improvement Program, the Texas Department of Transportation (TxDOT) focuses on transforming concrete-dominated landscapes by planting native trees. The program encourages reforestation, provides erosion control, and improves air quality. The program partners with community groups to plant trees primarily along freeway systems, but also along other roadways. TxDOT has planted over 3 million trees in 23 years in their six county Houston District to help mitigate the effects of air pollution in districts that have air quality non-attainment counties.[27]

Houston Wilderness

Houston Wilderness provides several resources with a focus on which trees provide benefits to the communities where they are planted. This includes the Super Trees for Sustainability Initiative, which is a large-scale native tree planting collaborative effort to support biodiversity and reduce community health risks, and the Regional Native Tree Planting Policy and Guidelines Manual.

- Native Super Trees List
- Super Trees for Sustainability Initiative
- Houston Ship Channel T.R.E.E.S. Program

Tree Strategy Implementation Group

Houston Wilderness also leads the Tree Strategy Implementation Group (TSIG), a collaborative effort to implement Houston's goal of 4.6 million new native trees by 2030. The group created a manual for native tree planting policy and guidelines for the greater Houston Area. TSIG includes stakeholders across the City of Houston and state departments, local non-profits, landscape architects, and engineers. TSIG also shared video forums held during the development of the report, which are accessible to the public as well. The manual includes information on planting styles, regional soils, native tree characteristics, removal of invasive or diseased trees, and multiple benefits of native trees.

- Regional Native Tree Planting Policy and Guidelines Manual
- TSIG Webinars and Video Forums

[27] Interview with TXDOT on December 2, 2022.

Conclusion

When tree planting projects are co-developed with community members, community resilience can be strengthened by the social, environmental, and economic co-benefits of increased urban tree canopy. This report presents a framework for planning future tree planting efforts in the Houston region, along with recommendations and resources for supporting Tree Equity. Four key components for Equitable Tree Plantings were identified from interviewing community leaders and local tree planting organizations: 1) consideration for extreme heat, low tree canopy, and disadvantaged communities, 2) funding for watering and maintenance, 3) community engagement and stewardship, and 4) coordination and collaboration. Through this equitable tree planting approach, the social and environmental health benefits of increased urban tree canopy may be experienced by all Houstonians.