HOUSTON AREA URBAN FORESTS

A REGIONAL FRAMEWORK FOR SUPPORTING HEALTHY URBAN FORESTS IN THE GREATER HOUSTON AREA

Houston Area Urban Forests

U.S. Endowment for Forestry and Communities

AMERICAN FORESTS

H-GAC Houston-Galveston Area Council

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A regional framework for supporting healthy urban forests in the Greater Houston Area

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Prepared for the U.S. Endowment for Forestry and Communities, Inc., American Forests, and the local partners of the Houston Area Urban Forests project by:

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Their input shaped the issues, goals, and recommendations represented in this document. We are grateful for their expertise, resources, and efforts.

Local Partners

Advanced Ecology
Bartlett Tree Experts
Bayou Land Conservancy
City of Bellaire
City of Bunker Hill Village
City of Houston
City of Jersey Village
City of Missouri City
City of Pasadena
City of Sugar Land
Cypress Creek Flood Control Coalition
Galveston Island Tree Conservancy
Harris County
Harris County Flood Control District
Hermann Park Conservancy
Houston Area Urban Forestry Council
Houston Wilderness
Memorial Park Conservancy
Texas A&M AgriLife Extension
Texas A&M Forest Service
Trees for Houston
The Woodlands Township

Project Leadership

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Introduction

Trees are an integral and valuable part of the urban landscapes of the Greater Houston area. Whether they are part of forest ecosystems in local parks and along waterways, or form the canopies that shade area neighborhoods, urban forests provide a wealth of services to our communities. Healthy, sustainable urban forests are an essential component to our region's continued prosperity and quality of life.

Houston and the adjacent cities and urban areas of Harris, Fort Bend, and Montgomery counties are continuing to experience rapid growth. An additional five million people will live, work, and recreate in the eight-county Houston-Galveston region by 2050. As the region seeks to accommodate this growth, it is crucial to pursue strategies to maintain and enhance our urban forests and raise awareness among decision-makers and the public of the values urban trees provide.

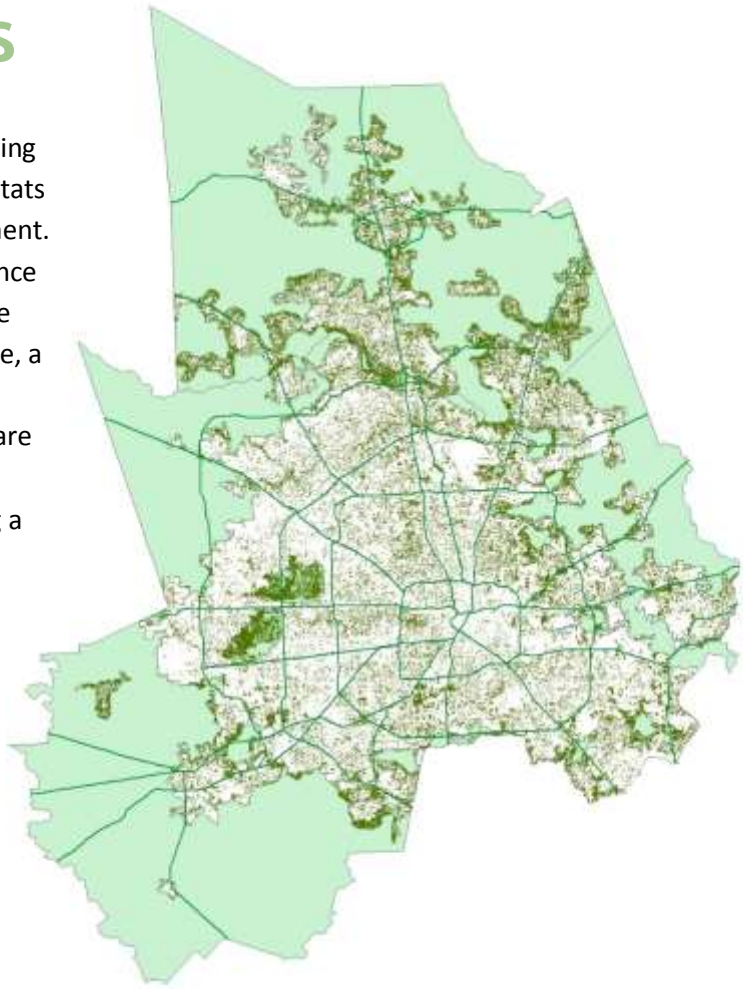
The purpose of this document is to provide a roadmap for progress based on ongoing coordination between local entities involved in urban forest management. It outlines shared goals and objectives, recommended strategies and projects, and available resources to meet them. More information on this effort can be found at **www.houstonforests.com.**

Vision Statement

A region characterized by a healthy, diverse, and sustainable network of urban forests providing social, economic, environmental, and quality of life benefits for all its residents.

State of the Forests

The Houston area includes dense piney woods, sprawling prairies, coastal wetlands, and bottomland forests, all colliding at this junction of ecoregions. Overlaid on these varied habitats are the pervasive changes shaped by centuries of development. Treed areas and manicured open space now stand where once open prairie and wooded bayous would have dominated the landscape. From this interaction has sprung a new landscape, a hybrid of natural and urban elements. The trees and forest systems that comingle with the region's built environment are the focus of this document. These "urban forests" challenge perceptions of what a forest is, and bring a unique set of benefits and challenges.



The Urban Forests

The urbanized areas of Harris, Montgomery, and Fort Bend counties[1] contain a diverse blend of tree species, both native and exotic. Individual plantings along sidewalks and residential properties, small tree communities tucked among developed parcels, and large forest systems in parks and natural areas collectively make up the **urban forests** of the project area. Unlike our traditional concept of nature as a place we "go to," these are the forests that we live and work among and that provide a host of benefits to us. The number and type of organizations who are actively or indirectly involved in managing this resource is nearly as diverse as the tree species and habitats themselves. Local governments manage trees in rights-of-way and parks, drainage districts and utilities shape large swathes of riparian forest and large-scale plantings, non-governmental organizations promote forests through a variety of means, and private residences and businesses reshape their own piece of the regional forests through their landscaping choices. All of these interactions shape the region's relationship with its urban forest.

[1]While the current project focuses on three of the counties of the core urban area of the Houston-Galveston region, additional dense urban development exists in the region, most notably the City of Galveston. These areas are not directly addressed here, but likely face many of the same challenges, and may find some utility in the considerations of this document.

Forest Composition and Stewardship

The region's hybrid forests and collections of urban trees represent an appreciable difference from what early pioneers would have encountered in the Houston area, with most trees clustered along bayous amidst seas of prairie grasses. The extent to which we have shaped the environment is evident in the sheer number of trees fostered in our built environment and the mix and relative prominence of species, especially non-natives and invasives. Currently, the canopy of the collective assortment of urban trees in the project area represents approximately 18% of the total project area, though far denser in some areas, and much sparser in others. The broad array of tree species, especially those not native to the area, reflects the alterations that began with the earliest settlements and layers of subsequent plantings.

Trees are spread across public and private lands, and subject to overlapping jurisdictions and competing interests. Although management is primarily local or private, regional organization is provided by state entities like the Texas Forest Service and local organizations like the Houston Area Urban Forestry Council.

The following descriptions are based on data from a detailed report[2] from the U.S. Forest Service/Texas Forest Service. While that report focuses on the City of Houston, and species and numbers vary in the project area, it is useful as a snapshot of the complex and dynamic character of the Greater Houston area's urban forests.

NUMBERS

There are an estimated 33 million trees in Houston alone, with a far greater number in the Greater Houston area. Based on the sampling within Houston:

- Over **70%** are small or young trees less than five inches in diameter.
- Canopy cover is **18.4%** as a percentage of land area in Houston.
- Some of the densest remaining forests are in rapidly developing areas.

SPECIES

While speciation varies between the dense pines in the north, and the coastal areas in the south, the big picture of Houston shows:

- Overall dominance of ten species, with yaupon and Chinese tallowtree making up **40%** of all trees.
- Managed areas dominated by species such as pear trees, live oaks, crepe myrtles, etc.
- Large trees are under-represented in saplings.

OWNERSHIP

Ownership and management of the forests is shared between public and private entities and represents a diverse set of approaches, scales of operation, and management styles. In just the City of Houston:

- **58%** of all trees are on private lands, including individual residences.
- **42%** of trees are on local or federal government property, including parks, reserves, rights of way, and individual properties.

Benefits of Urban Trees

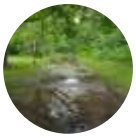
Beyond the aesthetic value of tree-lined streets and forest enclaves, urban trees provide a host of benefits in the form of valuable ecosystem services. Trees help mitigate the impacts of the built environment, increasing resilience, decreasing energy and health costs, and improving public health in tangible and quantifiable[1] ways. Costs involved in tree plantings are often offset quickly by the value of the services they provide. Because these values may be indirect or long term, they are not always given sufficient consideration in planning decisions.

Reduced Air Pollution

Trees help reduce air pollutants such as ozone, sulfur dioxide, nitrogen dioxide, and particulates while providing oxygen. The direct value of pollutant removal is improved public health and related costs and costs associated with regulatory mandates.

Improved Water Quality

Forest systems in areas next to waterways help slow runoff and filter pollutants in storm flows. Their root systems help prevent increased erosion of banks and channels. Shaded waterways have higher levels of dissolved oxygen for aquatic life.



Avoided Stormwater

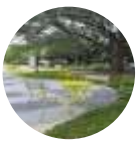
Urban trees help intercept rainfall, storing or releasing to the air large volumes of water that would otherwise contribute to the area's copious stormwater flows. The direct benefit to the area's resilience is in avoided drainage infrastructure costs. Trees also help reduce erosion.

Heat Reduction

The built environment can act as a heat island, as impervious surfaces absorb and release radiant heat energy. Tree canopy lowers ground temperatures and provides cooling as they evaporate water, reducing building cooling costs, energy demand, and public health impacts.

Habitat

The loss of natural habitat in development can be partially offset by urban forests. Houston's urban forests are especially important for migrating birds and other animals, but also foster space for related plant communities.



Other Benefits

Urban trees also Increase property values, store carbon and mitigate climate change, increase economic activity due to tourism and business district appeal, reduce noise and visual pollution, and generally promote public health and community pride.

[2] *For more detailed information on forest composition and quantified benefits of trees, please view the full report at* https://www.fs.usda.gov/treesearch/pubs/54109 *or use the interactive My City's Trees application at* http://tfsfrd.tamu.edu/mycitystrees/app .

Regional Priorities and Challenges

The ways in which we manage urban forests reflect the values and priorities each organization or community holds, and the unique challenges they face. Regional urban forestry goals and objectives stem directly from where organizations' shared challenges and priorities overlap. The following discussion of these challenges and priorities represent the outcome of a series of interviews, workshops, and planning efforts. Representing local, state and federal governments, private forestry businesses, concerned residents, and a range of non-governmental organizations involved in urban forestry management, the project partners sought to find overlapping areas of concern and priority as the basis for establishing a roadmap of goals and objectives for the region. This list of issues is not intended to be exhaustive, and each entity has its own unique problems and management mindsets. However, it reflects the needs and concerns common to the region.

Priorities

RESOURCES — Ensuring the availability of resources in the form of funding, staff capacity and availability, equipment, and technical knowledge.

ENVIRONMENTAL QUALITY — Benefitting from the ecosystem services provided by urban trees to improve water, reduce air pollution, reduce heat island impacts, store carbon, etc.

OUTREACH — Engaging and educating the public, both for the benefit of the community and in building consensus and support for forestry efforts.

COORDINATION — Coordinating related efforts and disseminating knowledge between urban forestry professionals to identify partnerships and opportunities to maximize resources.

HYDROLOGY — Utilizing urban trees to increase resilience to flooding, protect against erosion, and reduce storm flows as a function of living in a region with flooding concerns.

DATA — Enhancing geospatial and other data resources, and improving data dissemination and sharing to help guide forestry efforts.

COMMUNITY VALUES — Increasing quality of life by using trees to beautify areas, increase property values, attract business activity in commercial areas, and establish a sense of place for communities.

REFORESTATION — Replacing prior treed areas, conducting new plantings, or diversifying tree species where appropriate to grow the urban forest.

CONSERVATION — Maintaining existing forests and trees for habitat, historical value, and mitigation of other impacts.

Challenges

PUBLIC PERCEPTION Engaging the public to ensure good choices in residential and business plantings and build support for forestry initiatives.

FOREST LOSS Mitigating the impacts of development on forest loss in areas being converted to urban land uses and loss of trees in urban areas to drought, etc.

RESILIENCE Preparing our urban spaces and trees to be best able to withstand drought, fire, disasters, and a changing climate.

INVASIVES Addressing the threat of current (e.g., Chinese tallowtree, oak wilt) and potential (e.g., Emerald Ash Borer, Southern Pine Beetle) invasive species.

RESOURCES Identifying ways to close the gap between existing funding, staff capacity, and technical resources, and those needed to meet current and desired operational goals.

CAPACITY Enhancing our ability to supply adequate volumes and diversity of tree species to meet existing demands and being prepared for high demand events like droughts.

DIVERSITY Overcoming the inherent vulnerabilities in our reliance on a small number of species by proliferating a more diverse palate of trees in development and planting efforts.

PUBLIC SAFETY Preventing threats to public safety posed by damaged trees, less desirable tree choices, and stressed forest systems.

EQUITY Ensuring the benefits of trees do not disproportionately benefit some communities over others, by considering equity issues in urban forest planning.

Regional Goals

The Houston area has experienced substantial growth in recent decades. While this robust growth reflects the prosperity and unique character of the Houston area, many of the challenges to maintaining our quality of life and the sustainability of our natural systems arise from its impacts. The dynamic nature of the region's development drives many of the urban forestry priorities and lies at the root of many challenges. The issues the area faces are greater than any one jurisdiction. Addressing them will require coordination and regional approach.

A Regional Vision

The Houston area benefits from a regional approach in many planning disciplines, including transportation, water quality and supply, and hazard mitigation. These existing efforts serve as a model for a regional vision for promoting and enhancing urban forestry goals. As growth pushes out into remaining forested land and urban populations densify, the value and necessity of urban forests is a crucial component of the region's future.

The priorities and challenges expressed by local urban forestry professionals form the basis of a series of broad regional goals and objectives. Each individual goal and objective may not be relevant to every organization, but in aggregate they represent the desired conditions for the region's future and the guiding principles and effective strategies needed to reach them. This forestry roadmap seeks to link the vigorous and comprehensive work being done by the area's urban foresters to a regional context of goals and objectives developed with a broad group of local partners.

Guiding Principles

The development and implementation of the regional goals and objectives relies on a series of guiding principles held in common by local urban forestry partners. They include:

- **Flexibility** – Planned activities should adapt to meet changing conditions or resources.
- **Well-informed decisions** – decisions should be guided by good data and forethought.
- **Right tree, right place** – decisions on plantings should seek to match trees to local conditions.
- **Transparency** – forestry efforts should seek to include and foster community members' input.
- **Coordination** – whenever possible, partnership opportunities and participation in regional planning serves shared priorities.
- **Hierarchy of value** – All things being equal, native or well adapted species are preferable, but all trees, even invasives, provide benefits.
- **Big trees** – Emphasis should be placed on the enhanced benefits of larger trees.

From Shared Issues to Shared Goals

The fundamental steps in developing shared regional goals are identifying areas of overlap and consolidating related issues into collective strategies. Based on a consideration of similarities between the priorities and challenges, a review with project partners, established the following broad goals. Priorities are shown in green, while challenges are shown in orange.

GROW	PROTECT	ORGANIZE	ENGAGE
Increase urban forests, tree canopy, and species diversity	*Maintain existing urban forests and enhance their health*	*Increase coordination; expand capacity, data, and resources*	*Engage the public to encourage awareness of the value of forests*
• Environmental Quality • Reforestation • Forest Loss • Resilience • Diversity	• Hydrology • Environmental Quality • Conservation • Resilience • Resources • Invasives • Public Safety	• Resources • Coordination • Data • Capacity	• Outreach • Community Values • Public Perception • Equity

Goals, Objectives, Actions

The usefulness of broad goals is reliant on the ability to translate those goals into specific steps and discrete actions. Each of the four goals established as part of this regional approach has primary objectives; ways in which the goal will be addressed. Similarly, each objective has one or more actions; means by which the objective will be implemented. Goals provide the desired condition, objectives the paths to reach it, and actions are the steps along the way. The actions identified here are intended as a representative selection rather than an exhaustive list, relying on the resourcefulness of partners to create a full palette of actions.

 OBJECTIVE

 ACTION

GROW

Regional Goal *- Increase and diversify urban tree canopy and forest systems to generate additional benefits. Existing example projects range from large scale plantings as part of countywide flood control efforts (Harris County Flood Control), medium-scale efforts like restorative plantings or invasive replacement in area parks (Cities, Park Conservancies) and small-scale decisions like residential plantings. "Right Tree, Right Place" and a focus on appropriate species should be guiding considerations.*

OBJECTIVES AND ACTIONS

PLANTINGS

Increase urban tree canopy and the extent of forest systems, especially in riparian areas and areas with limited existing canopy, through direct plantings. Consider and balance competing interests (drainage needs, etc.) in siting.

Public Plantings

Continue and expand existing efforts by partner agencies to plant trees in easements, parks, rights-of-way, and institutional properties.

Partner Plantings

Support and encourage private residential, commercial, and industrial plantings.

Regional Projects

Conduct funded calls for projects that serve regional goals to foster planting efforts.

DIVERSIFICATION

Enhance the diversity of our regional mix of trees by utilizing native and area-appropriate species when possible and avoiding overreliance on single species.

Planning for New Development

Consider expanded species palettes in development codes and site decisions.

Restorative Plantings

Where appropriate, replace invasives or lost trees with diverse, area-appropriate species

Expand Nursery Capacity

Consider opportunities to generate additional nursery capacity.

PROTECT

Regional Goal *- Maintain existing urban canopy, especially high value native trees and forest systems through direct protection and addressing threats (invasives.) Example projects include large-scale approaches to addressing invasives (Texas Forest Service monitoring for Emerald Ash Borer), medium-scale efforts like planning restoration to include area-appropriate species (Memorial Park Conservancy's Master Plan), and small-scale efforts like protecting historically important trees (Missouri City's Freedom Tree.)*

OBJECTIVES AND ACTIONS

CONSERVATION

Maintain existing urban trees and forests systems by acquiring treed areas or incentivizing preservation.

Acquisition

Acquire ownership or easements for areas with existing forests or tree systems as part of public parkland or by private entities (e.g. Houston Audubon preserves.)

Planning for Canopy

Build consideration or canopy and forest benefits into planning for park development (e.g. maintaining treed areas in addition to manicured lawns.)

INVASIVES MANAGEMENT

Address existing invasive species, pests and diseases and plan for future threats.

Invasive Plant Management

Remove invasive trees, preferably with area-appropriate species replacement.

Coordinate with Regional Efforts

Take part in regional monitoring or planning efforts addressing threats from invasive pests and disease. Plan for invasive pest management.

RIGHT OF WAY MANAGEMENT

Dissuade tree removal in rights of way and enhance existing tree management.

Tree Ordinances

Consider enacting protective tree ordinances.

ROW Planting

Use ROWs to enhance urban canopy.

ORGANIZE

Regional Goal - *Increase coordination among urban forestry professionals, build organizational capacity, and enhance financial and data resources. Example projects include developing better data for decision-making (H-GAC's Urban Forestry GIS Tool, Texas Forest Service's My City's Trees application), fostering coordination through ongoing regional organizations (Houston Area Urban Forestry Council), promoting projects to funding resources (Houston Wilderness's Regional Conservation Plan), and generating nursery capacity (Trees for Houston).*

OBJECTIVES AND ACTIONS

COORDINATION

Maintain, enhance, and supplement existing networking opportunities and shared planning efforts.

Foster Regional Networking
Participate in, and foster additional networking opportunities.

Facilitate Regional Coordination
Seek partnership opportunities to maximize resources. Consider ongoing regional facilitation.

DEVELOP RESOURCES

Seek expanded financial resources and develop additional technical resources.

Conduct Inventories
Conduct, acquire, or revisit tree inventories to serve as a baseline for management.

Develop Regional Data
Support or develop regional data for urban forests and tree canopy.

Establish Best Practices
Support or develop recommendations for local urban forestry best practices.

Develop Financial Resources
Participate in regional funding initiatives; build local funding relationships.

EXPAND ORGANIZATIONAL CAPACITY

Seek expanded financial resources and develop additional technical resources.

Employee Development
Invest in employee training to build capacity.

Organization Mentoring
Mentor a developing urban forest program, or seek mentoring for your program.

ENGAGE

Regional Goal - *Foster public appreciation of the benefits of tree canopy and urban forests to support ongoing forestry efforts. This goal supports increased efforts to engage the public in urban forestry programs and decisions. Example efforts include public stakeholder groups for land use planning (Harris County Flood Control District's Halls Ahead project), direct participation opportunities (Houston Area Urban Forestry Council's Annual Tree Planting Competition) outreach at public events (Trees for Houston).*

OBJECTIVES AND ACTIONS

PUBLIC OUTREACH

Continue and supplement existing outreach efforts on general values or specific to individual projects.

Public Events

Maintain a presence at related events (e.g. a booth at an environmental festival).

Develop Model Materials

Develop or consider the use of model materials (e.g., ordinance, outreach) that could be used by multiple organizations.

Consider Branding

Identify ways to increase visibility of urban forestry efforts through local or regional branding or award programs.

Involve the Public

Hold events that involve the public directly in plantings or other tangible contact.

REPRESENTATION

Increase representation of urban forestry priorities in other planning efforts.

Coordinate with Regional Plans

Seek to represent urban forestry priorities, or support regional representation, in related planning efforts (e.g., Planning and Zoning Commissions, watershed protection projects, regional transportation planning, air quality planning, park development planning, among others).

Advocate for Forests

As appropriate, seek to represent urban forests in legislative considerations.

Case Studies

One of the best assets for urban forestry efforts in the Greater Houston Area is the existing wealth of proven programs and projects. Both public and private partners are actively engaged in initiatives that serve as case studies of effective strategies for meeting the area's urban forest goals. A comprehensive approach to regional urban forestry cannot rely on a single solution; it needs commitment and activity at a variety of levels. The projects and entities highlighted below are just a sample of the existing urban forest activities in the area.

Houston Area Urban Forestry Council - *Networking*

The Council is the catalyst for interaction among public and private urban forestry professionals in the Houston area. Their meetings and events help foster a sense of community and highlight the value of networking and coordination. Their annual planting competition increases interactions between urban forestry and area residents and organizations.

Trees for Houston - *Growing Capacity*

Trees for Houston is a relentless force in promoting urban forestry by providing trees, assisting plantings, and conducting effective public outreach. Their focus on expanding nursery capacity and their niche role in directly facilitating plantings is a prominent example of developing resources to meet the specific needs of the area.

City of Houston - *Data Driven*

The City of Houston contains over 30 million trees, a scale hard to comprehend at street level. The City has committed to a data-driven approach to managing its urban forests. In addition to using spatial analysis of canopy benefits in partnership with reforestation decisions, the City is working to further develop its substantial right of way and park tree inventory data to support future efforts, exemplifying the power of data resources to support urban forestry priorities.

Texas Forest Service - *Integration*

Texas Forest Service staff have been at the forefront of enhancing coordination between forestry professionals and related fields like source water protection. Their focus on bringing professionals from different disciplines around the same table for efforts like their Forests and Drinking Water Forum is an example of effective integration of urban forestry values into broader considerations.

Harris County Flood Control District - *Balancing Interests*

In addition to their widespread planting efforts, the District's development of large-scale detention efforts like the Project Brays locations has effectively re-imagined the traditional drainage paradigm to incorporate multiple uses. This project is a visible example of incorporating the importance of trees and wetlands in a transformative way.

City of Missouri City - *Breaking the Threshold*

Overcoming the public's threshold of attention to engage community members is a daunting challenge for any program. Missouri City's Edible Arbor Trail and related plantings exemplify a creative approach to directly engaging the public and heightening the visibility of urban forestry efforts. Their effort creates spaces that encourage active interaction with the public.

Resources

Progress toward local and regional urban forestry goals requires a solid foundation of the tools, funding, and technical knowledge needed to translate broad strategies into on-the-ground actions. This section highlights some of the many data tools, technical resources and potential funding sources that can help turn big ideas into big results. Additional information on resources for the Greater Houston area can be found at www.houstonforests.com.

Tools and Data

There are a wide range of models and other data tools available for urban forestry programs, ranging from complex simulations to simple computations. The tools and data sources highlighted here are specific to the Houston area, or are free to use, easily accessible, and user-friendly.

My City's Trees

Specific to the City of Houston (but with potential application for other areas), this US Forest Service/Texas A&M Forest Service application allows both residents and forestry professionals to visualize forestry data on a regional scale, and provides estimates of benefits for pre-determined areas. Data for this application is based on real, updated tree inventory samples. (tfsfrd.tamu.edu/mycitystrees)

Urban Forestry Tool

H-GAC's Urban Forestry Tool allows users to create and compare project boundaries to prioritize forestry decisions. The online tool draws from actual canopy areas from satellite imagery, so potential projects can evaluate tree cover and position in relation to waterways, floodplains, transportation networks, population density, and economic equity among other factors. (http://arcgis02.h-gac.com/urbanforestry/)

I-Tree

Available in various forms for different uses, I-Tree is a frequently-used tool for modeling and assessing various impacts and planning considerations for trees. The applications represent a partnership effort between the US Forestry Service and other forestry organizations. The widespread use of these tools makes results more likely to be comparable with other areas. (www.itreetools.org)

Funding

Funding resources are often a limiting factor for urban forestry projects and programs. Maximizing existing resources through partnerships and regional efforts can help stretch budgets. However, identifying and pursuing additional resources will be necessary to develop the projects and initiatives needed to reach regional urban forestry goals. Matching appropriate funding sources to the specific needs of each organization is crucial to this aim. The partial list of potential funding resources presented here is intended to be a starting point in evaluating potential sources for local partners. These sources are intended to be supplemental to traditional funding sources (tax revenue, private donations, etc.) Bundling similar regional projects may increase their attractiveness to large funding sources (e.g., RESTORE Act funding), but many of these sources are valuable for single, smaller projects as well. A more detailed list of resources can be found at www.houstonforests.com.

Source	Focus	Website	Notes
RESTORE Act (Gulf Oil Spill funds)	Coastal counties, coastal habitats, resilience	www.restorethetexascoast.org	One of the larger potential funding sources; no open call for projects right now; focus on large or bundles of projects.
American Forests Community ReLeaf	Expanding tree canopy in urban areas	www.americanforests.org/discover-american-forests/our-work/#Community ReLeaf	Specific focus on urban forests; most applicable to municipalities and tree-planting organizations.
Texas Parks and Wildlife Department Recreation Grants	Various, with emphasis on conserving natural areas for public recreation	tpwd.texas.gov/business/grants/recreation-grants	The Local Parks Grants program is most applicable.
Endowments and Foundations	Various, environmental themes	• www.houstonendowment.org • www.powellfoundation.org • cgmf.org/p/home.html • www.shell.us/sustainability/request-for-a-grant-from-shell.html • kinderfoundation.org/major-gifts/urban-green-space • www.thegeorgefoundation.org • https://www.mfi.org/Initiatives.html	The Houston Endowment, Powell Foundation, Cynthia and George Mitchell Foundation, Shell Foundation, Kinder Foundation, George Foundation (Fort Bend County) and Meadows Foundations all have applicable environmental funding focuses. Specific projects are best discussed with the individual entity.
Trees for Houston	Tree plantings	www.treesforhouston.org	In-kind donations of trees and technical expertise.

Source	Focus	Website	Notes
Texas Urban Forestry Council	Urban Forestry Micro-grant program	http://www.texasurbantrees.org	$500 grants with 1:1 match.
Trust for Public Land	Large-scale conservation acquisition	www.tpl.org	TPL works to facilitate the conservation of large natural areas in conjunction with technical support on conservation finance.
EPA Urban Waters Small Grants	Water quality	https://www.epa.gov/urbanwaters/urban-waters-small-grants	Potential to use riparian trees/forests as water quality best practice.
US Forest Service	Various urban forestry programs	https://www.fs.fed.us/managing-land/urban-forests	Various competitive grant programs (and technical resources), cost share likely involved.
Other Federal Grants	Various	Grants.gov	Grants.gov is the clearinghouse for most federal grants, and is a good starting point for assessing potential federal funding resources. Applicability will vary.

Examples of Non-traditional Funding Models

City of Austin Urban Forest Grant

The City of Austin incentivizes tree stewardship projects by setting aside funding for competitive grants. The program includes plantings, maintenance, outreach, invasives control and other related efforts. By providing a central, competitive funding source Austin benefits from "crowd-sourcing" ingenious ways to promote its urban forestry goals, and engages a broader range of organizations in their pursuit. (www.austintexas.gov/page/urban-forest-grant-program)

Supplemental Environmental Projects

TCEQ allows individual entities and third parties to set up environmentally oriented projects that permittees can elect to fund with a portion of fees associated with violations. The benefits of urban forests for air and water quality could potentially make a Houston Urban Forests SEP attractive. SEP funding is not guaranteed, but can supplement existing funds for greater impact. (www.tceq.texas.gov/compliance/enforcement/sep)

Gulf-Houston Regional Conservation Plan (RCP)

The RCP provides a framework for promoting regional environmental projects to funding sources (e.g., RESTORE Act) and a basis for exploring partnership opportunities and bundling projects. (houstonwilderness.org/gulf-houston-regional-conservation-plan)

Programs and Expertise

The Houston region's urban forestry programs represent a wealth of knowledge and technical expertise. Combined with support from state and national entities like the Texas A&M Forest Service and US Forest Service, there are numerous technical resources available to organizations looking to grow their capacity. The resources described below are a sample of support services and model programs available to local partners. A more detailed list of resources can be found at www.houstonforests.com.

As noted in the recommended actions in this document, one of the most meaningful ways to reach common goals is to seek advice and mentoring from organizations with greater capacity, or consider what your organization has to offer those developing urban forestry programs. Our shared knowledge is our greatest tool for affecting regional change.

Texas A&M Forest Service

The Texas A&M Forest Service's Urban and Community Forestry site provides a wealth of resources for Texas communities, ranging from planting and technical guidance to conservation education materials. (texasforestservice.tamu.edu/communityforestryresources)

Trees for Houston

In addition to working with local partners to provide trees, Trees for Houston offers information resources on tree plantings, education support, and technical guidance on conservation and mitigation projects using trees as part of their Trees for Texas program. (www.treesforhouston.org/programs-overview)

Centerpoint Energy

Centerpoint Energy provides information on selecting tree species in areas with electrical utility easements as part of their Right Tree, Right Place focus. (www.centerpointenergy.com/en-us/safety/pages/tree-planting-guide.aspx)

US Forest Service

The US Forest Service's Urban and Community Forestry program offers webinars, educational materials, and technical guidance on a range of community and landscape level forestry issues. (www.fs.fed.us/managing-land/urban-forests)

Harris County Flood Control District

The District provides a series of technical manuals and materials that consider the role of trees in wet bottom detention basin design, low impact design, and other structural situations. (www.hcfcd.org/technical-manuals/technical-document-library)

Houston Area Urban Forestry Council

The Council's website contains an assortment of tree guides, planting advice, technical manuals, and links to other local, state, and national resources. (haufc.org)

Branching Out

A proposal for short-term actions to support urban forestry in the Greater Houston region

The growth of a forest starts with a single seed. Coordination and supporting the efforts of local urban forest partners is the seed from which successful regional programs grow. This proposal highlights a series of short term-recommendations to supplement existing efforts to support urban forestry in the region. These actions will provide momentum and serve as a catalyst for transforming local actions into regional success.

Recommendation 1 – Coordination Support

Local partners benefit from sharing ideas, and partnership opportunities to maximize resources. Current informal networking, and efforts by industry groups and organizations like the Houston Area Urban Forest Council should be supplemented with periodic roundtables, workshops, and related support with a regional focus.

Recommendation 2 – Enhanced Data

Further development of canopy data for an expanded project area (additional urbanized areas in the 13 county H-GAC region), select prioritization analyses, and further development and integration of mapping tools are three tasks that would support local and regional planning goals.

Recommendation 3 – Capacity Building

Increasing the capacity of programs and staff is a fundamental step to supporting regional goals. Specific components of this action would be to hold technical trainings on pertinent topics (invasive identification and management, grant writing for forestry projects, forestry considerations in other planning disciplines, etc.), identify and promote model materials (model ordinances, best practices, etc.), and build outreach programs.

Recommendation 4 – Priority Projects

Tangible, on-the-ground results in the form of plantings and related projects increase visibility with the public and generate direct benefits. Strategic investment in expanded and diversified canopy produces exceeding values in benefits. The following pages describe a series of priority projects identified by local urban forestry partners.

Trees await volunteers at a recent planting event at the City of Houston's Burnett Bayland Park. The City, American Forests, and H-GAC used project tools and methodologies developed for assessing priority planting sites among the City's Complete Communities neighborhood parks. This partnership helped field test the prioritization approach and assist the partners in maximizing the benefits of their planting event.

Priority Projects

The ultimate purpose of the regional goals and objectives for urban forestry in the Greater Houston area is to foster the development and implementation of tangible projects.

These initial projects focus on increasing canopy and its benefits, while also increasing the visibility of partner programs to the public. As a sample of the range of activities local partners undertake, these projects are priorities because of their ability to produce multiple benefits. A selection of these benefits is shown for each project. While every project local partners undertake is of value to the region's urban forests, these projects are also well aligned with regional priorities.

The projected growth of the region in the coming decades emphasizes the need to continue the process of identifying, fostering, and promoting individual projects. Developing future rounds of projects will be a crucial element in realizing progress toward the region's forestry goals.

Forests and flood control mingle at Keith-Wiess Park, Houston

Setting Priorities

These projects represent a set of regional values measured by metrics developed by local partners. The relative priority of local projects reflects a consideration of the total amount of canopy added; the relative canopy change for the site; the area density; its potential to improve water and air quality and reduce stormwater; and its potential public benefits. More information on the evaluation process developed by local partners can be found at www.houstonforests.com.

MEMORIAL PARK
OLD ARCHERY RANGE

Project Summary

Project Area	54 acres
Existing Canopy	46%
Canopy Increase	20.43 acres
Project Cost	$81,966
Area density index	90
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

The Old Archery Range of Houston's Memorial Park is located in a dense urban area west of I-610, adjacent to Buffalo Bayou. It is a popular recreation site. Memorial Park Conservancy (MPC) intends to re-establish native, site appropriate trees in the mid and understory to replace the overstory as relic trees expire, thus increasing species and structural diversity. Pre-planting site preparation and reforestation design is part of MPC's ecological restoration plans. Following invasive and undesirable species removal, appropriate site-specific species will be planted at a density of 500 trees per acre to reestablish native overstory, mid and understory species. Establishment of mature riparian canopy will also benefit site stability and regional water quality. The Memorial Park Conservancy manages the Old Archery Range and will be responsible for subsequent interventions to achieve successful establishment of planted trees. MPC will monitor survival rates, remove and treat invasive regeneration, as well as perform necessary follow up enhancement plantings should they be required. The resulting efforts should yield forest canopy resilient to regional climate and flooding for future generations of Houstonians to recreate within and enjoy. The Eastern Glades are actively being developed per the vision set forth in Memorial Park's 2015 Master Plan.

Select Benefits

2,118 Pounds of air pollutants removed a year

75,954 Gallons of runoff reduced a year

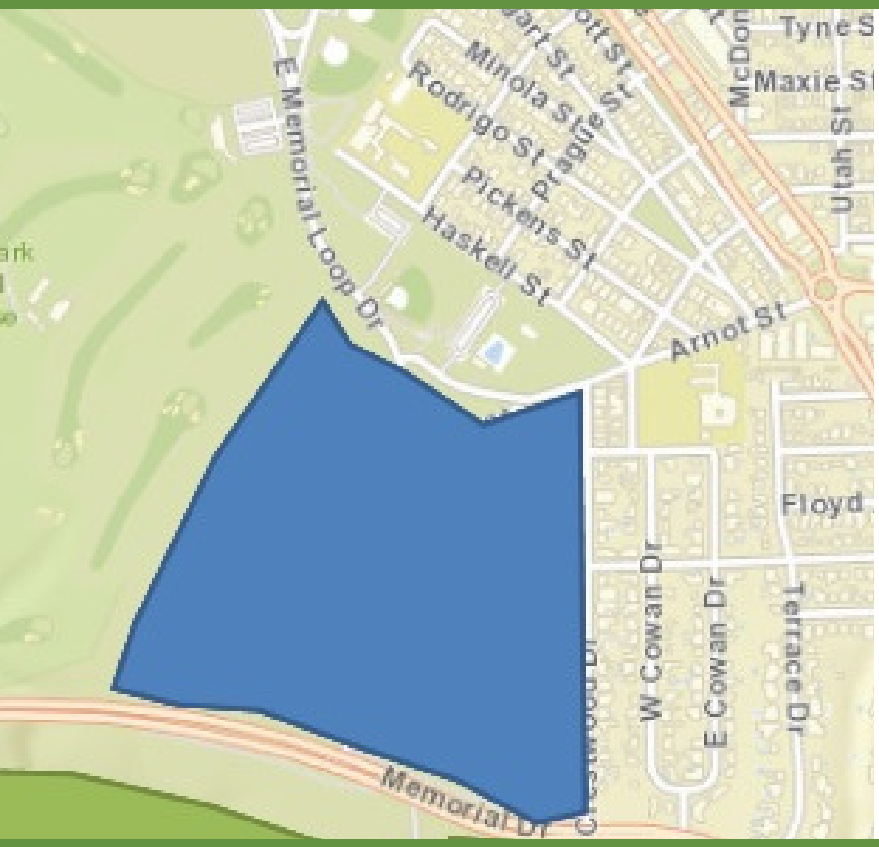
$8,946 decrease in pollutant related medical costs

$23,650 in energy savings due to reduced heat

1,792,811 pounds of carbon storage

CONTACT: CAROLYN WHITE 832-443-8378 CWHITE@MEMORIALPARKCONSERVANCY.ORG

MEMORIAL PARK
EASTERN GLADES



Project Summary

Project Area	124 acres
Existing Canopy	40%
Canopy Increase	13.2 acres
Project Cost	$191,222
Area density index	35
Adjacent to impaired water?	No
Includes floodplain?	No
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Located on the eastern extent of Memorial Park, the Eastern Glades will be the primary point of access to Memorial Park containing landscaped areas as well as naturally forested regions. Reforestation and stand improvement will be centered in these naturally vegetated areas to continue work completed after the 2011 drought. After site preparation, planting will be at a density of 500 trees per acre for pine-hardwood forests, and 200 trees per acre in clusters in pine hardwood savannah areas. Species planted will include only those native to the Memorial Park ecoregion and will be derived, from seed collected and grown at the park, where possible.

The Memorial Park Conservancy manages the Eastern Glades and will be responsible for subsequent interventions to achieve successful establishment of planted trees. MPC will monitor survival rates, remove and treat invasive regeneration, as well as perform necessary follow up enhancement plantings should they be required. The surrounding natural areas of the Eastern Glades will provide an impressive introduction to park visitors and a glimpse of the Houston region's historic ecosystem. The Eastern Glades are actively being developed per the vision set forth in Memorial Park's 2015 Master Plan.

Select Benefits

2,928 Pounds of air pollutants removed a year

104,987 Gallons of runoff reduced a year

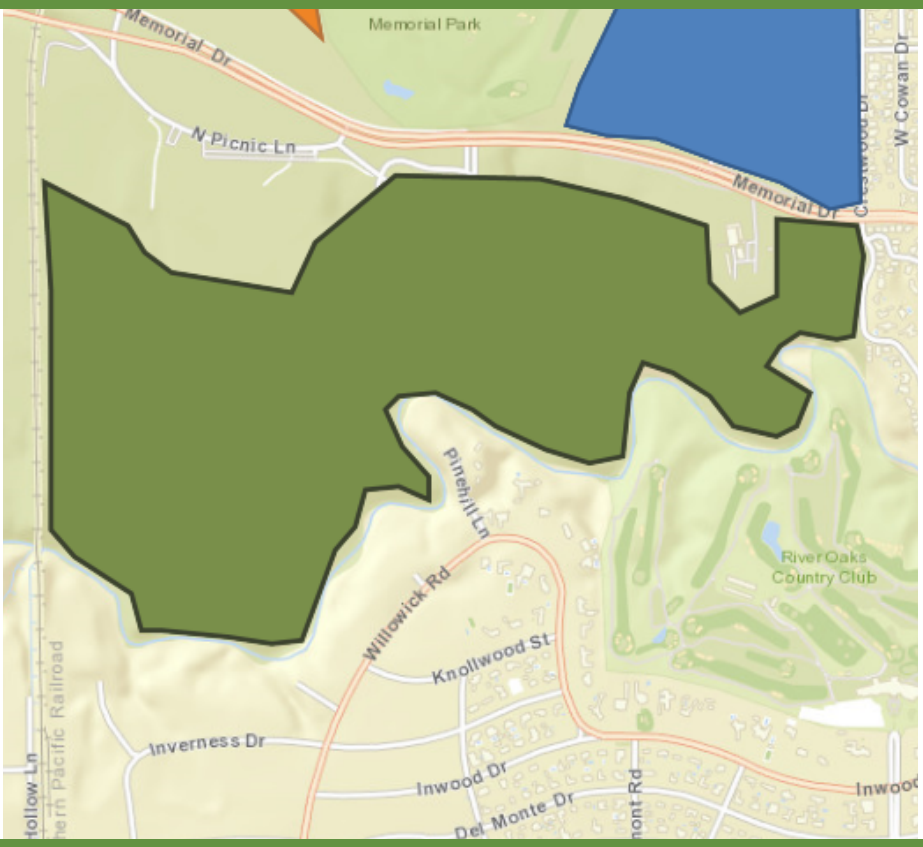
$12,365 decrease in pollutant related medical costs

$32,690 in energy savings due to reduced heat

2,478,110 pounds of carbon storage

CONTACT: CAROLYN WHITE 832-443-8378 CWHITE@MEMORIALPARKCONSERVANCY.ORG

MEMORIAL PARK
BAYOU WILDS



Project Summary

Project Area	420 acres
Existing Canopy	73%
Canopy Increase	78.5 acres
Project Cost	$778,092
Area density index	29
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Bayou Wilds in the southern portion of Memorial Park is already heavily used by park visitors for its immersive natural experience and will include additional trails in the future. Its varying ecosystems and their vicinity to the bayou have extensive wildlife value, but have proven difficult to manage due to invasive species and dense thickets. Biking trails have enhanced erosion near ravines and the bayou, Following site preparation, including mulching, cut stump or foliar herbicide treatment, pine-hardwood savannahs (a mix of pine and hardwoods)will be planted to a density of 200 trees per acre; Pine-hardwood forested areas with a higher tree density of 500 trees per acre. Species planted will include only those native to the Memorial Park ecoregion, and from Park seed, where possible. IRiparian areas will be planted with a a heavier component of hardwoods capacble of withstanding drought and inundation. Reintroduction of bald cypress (Taxodium distichum) and sweetbay magnolia (Magnolia virginiana), among other species, within the Bayou Wilds is a major goal of the ecological restoration. Memorial Park Conservancy manages the Bayou Wilds and will be responsible for subsequent interventions to achieve successful establishment of planted trees. MPC will monitor survival rates, remove and treat invasive regeneration, as well as perform necessary follow up enhancement plantings should they be required in accordance to the 2015 Memorial Park Master Plan.

Select Benefits

15,955 Pounds of air pollutants removed a year

572,127 Gallons of runoff reduced a year

$67,383 decrease in pollutant related medical costs

$178,146 in energy savings due to reduced heat

13,504,454 pounds of carbon storage

CONTACT: CAROLYN WHITE 832-443-8378 CWHITE@MEMORIALPARKCONSERVANCY.ORG

MEMORIAL PARK
MEMORIAL GROVES

Project Summary

Project Area	138 acres
Existing Canopy	39%
Canopy Increase	58.97 acres
Project Cost	$204,703
Area density index	18
Adjacent to impaired water?	No
Includes floodplain?	No
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Memorial Groves in the western portion of Memorial Park contains the site of the World War I training facility, Camp Logan, which make the site amongst the most culturally significant within the park. The site is severely degraded by invasive species. The 2015 Memorial Park Master Plan calls for native reforestation of 32 acres, as well as the installation of a 61-acre pine plantation in a manner protective of the Camp foundations. The pine plantation consisting of Loblolly Pine planted with 400 tree per acre density, with selective thinning performed 15-20 years after planting to maintain growth and structure. The reforestation areas will be prepared using mulching and herbicide treatment methods prior to planting in native overstory, mid-, and understory species with a density of 500 trees per acre. Memorial Park Conservancy manages the Memorial Groves and will be responsible for subsequent interventions to achieve successful establishment of planted trees. MPC will monitor survival rates, remove and treat invasive regeneration, as well as perform necessary follow up enhancement plantings should they be required. After establishment, the pine plantations will reinforce the cultural importance of the Camp Logan site and provide insight to Houston's history and role during World War I.

Select Benefits

6,115 Pounds of air pollutants removed a year

219,272 Gallons of runoff reduced a year

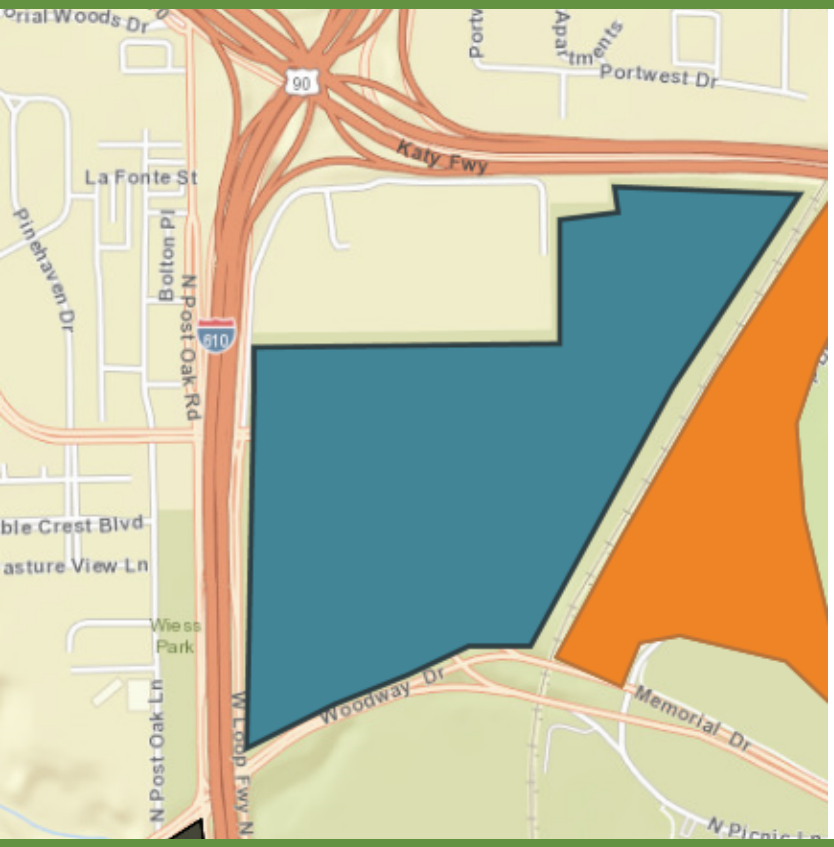
$25,825 decrease in pollutant related medical costs

$68,276 in energy savings due to reduced heat

5,175,683 pounds of carbon storage

CONTACT: CAROLYN WHITE 832-443-8378 CWHITE@MEMORIALPARKCONSERVANCY.ORG

MEMORIAL PARK
NORTHWEST TRAILS



Project Summary

Project Area	248 acres
Existing Canopy	59%
Canopy Increase	53.75 acres
Project Cost	$521,160
Area density index	34
Adjacent to impaired water?	No
Includes floodplain?	No
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Northwest Trails in the northwest corner of the park includes riparian habitat and drainage. Upon completion of Memorial Park's 2015 Master Plan the site will contain several miles of separate cycling and equestrian trails. The area is already greatly used by park visitors and has extensive wildlife value, but has proven difficult to manage for invasive species and dense thickets. Ecological restoration here includes pine-hardwood savannahs, which will be planted with a mix of various pines and hardwoods to a density of 200 trees per acre, pine-hardwood forested areas, planted at a density of 500 trees per acre, and riparian forests, planted with a heavier component of hardwoods capable of withstanding drought and inundation. Reintroduction of bald cypress and sweetbay magnolia among other species is a major goal of the Northwest Trails ecological restoration. Species planted will be those native to the Park ecoregion and will be derived from Park seed where possible. Memorial Park Conservancy manages the Northwest Trails and will be responsible for subsequent interventions to achieve successful establishment of planted trees. MPC will monitor survival rates, remove and treat invasive regeneration, as well as perform necessary follow up enhancement plantings should they be required. Upon completion the Northwest Trails will provide excellent recreation opportunities for park visitors, and be a model for riparian management for Buffalo Bayou tributaries.

Select Benefits

14,108 Pounds of air pollutants removed a year

505,909 Gallons of runoff reduced a year

$59,584 decrease in pollutant related medical costs

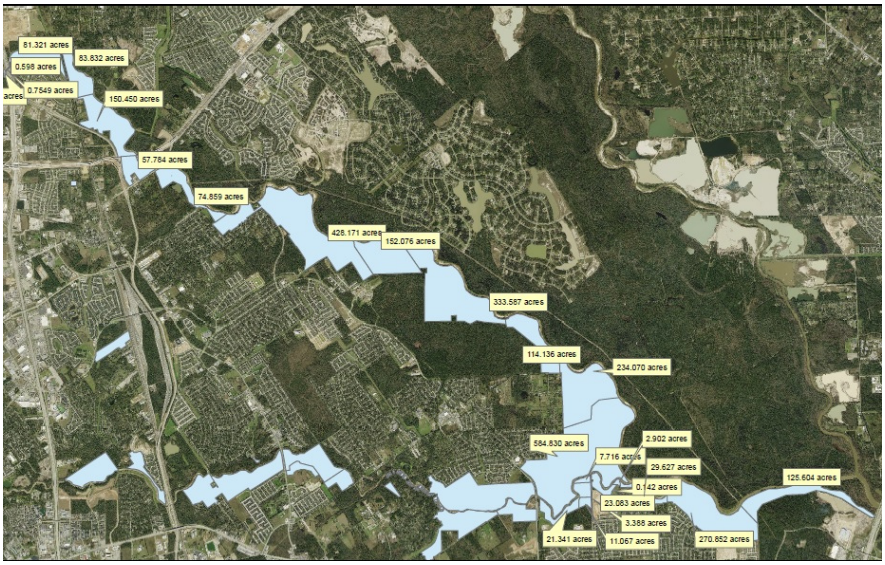
$157,527 in energy savings due to reduced heat

11,941,427 pounds of carbon storage

CONTACT: CAROLYN WHITE 832-443-8378 CWHITE@MEMORIALPARKCONSERVANCY.ORG

HARRIS COUNTY PRECINCT 4
SPRING CREEK GREENWAY TREE PLANTING

Project Summary



Project Area	5394 acres
Existing Canopy	56.8%
Canopy Increase	5.6 acres
Project Cost	$36,600
Area density index	10
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

The purpose of the Spring Creek Greenway Tree Planting Project is to establish native fruit and nut trees for public enjoyment as well as promoting forest development and diversification of the tree species along the Spring Creek Greenway trail system. As the primary partner responsible for this project, Harris County Precinct 4 will continue to monitor and maintain the plantings.

In 2016, Precinct 4 began implementing an intensive forest management plan, which involved planting 185 trees between 3 and 20 gallons. Areas that needed the most erosion management were selected as priority. One year later, 88 percent of the trees had survived and 20 percent were producing fruit. During the winter of 2017, Precinct 4 expanded the plantings to include bare-rooted tree seedlings, native grasses, as well as nectar and host plants for monarchs. Precinct 4 staff and volunteers planted 296 edibles along the Spring Creek Greenway, 307 edibles at Precinct 4 parks along Cypress Creek, and native grasses along an eroded Spring Creek Greenway bank. Plantings of trees in managed areas and monarch-host plants along greenways will continue during the 2018-2019 planting season. These plantings will aid in the control of invasive species as well as decrease rainwater runoff, improve water quality, and reduce erosion.

Select Benefits

218 Pounds of air pollutants removed a year

7,809 Gallons of runoff reduced a year

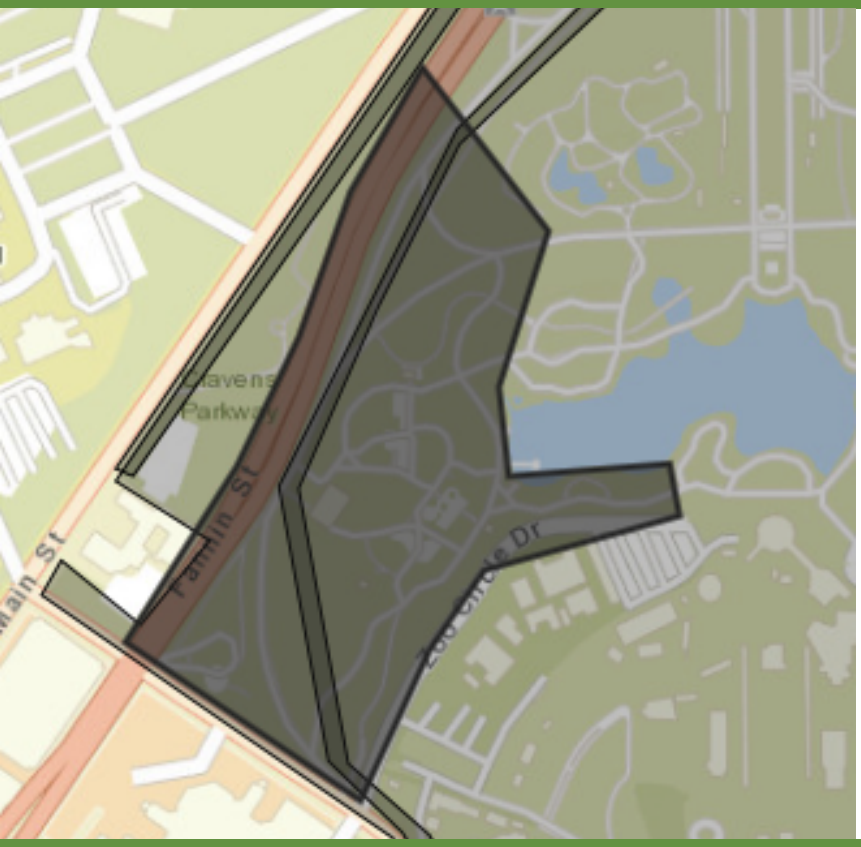
$920 decrease in pollutant related medical costs

$2,431 in energy savings due to reduced heat

184,319 pounds of carbon storage

CONTACT: LAURA CARLTON 832-725-4910 LCARLTON@HCP4.NET

HERMANN PARK
FAMILY COMMONS



Project Summary

Project Area	48 acres
Existing Canopy	22.9%
Canopy Increase	7 acres
Project Cost	$1,000,000
Area density index	95
Adjacent to impaired water?	No
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Hermann Park is a high profile destination southwest of downtown Houston, attracting a large number of visitors each year. The Famly Commons area of Hermann Park consists of a mix of open lawns, treed pathways, recreational sites, and small forest pockets. It is an underutilized area which is currently not fulfilling the needs of park visitors and nearby stakeholders. and is scheduled for renovation in 2019.

Current project partners consist of the City of Houston Parks and Recreation Department, Hermann Park Conservancy, and private donors. Additional tree canopy of approximately 1000 trees will be added to the existing trees which will be preserved as much as possible. Other elements of the project will include a children's water play area, a playground, and picnic areas fully accessible to children of all physical abilities, which will integrate with this reforestation project and other forestry efforts throughout Hermann Park.

Select Benefits

145 Pounds of air pollutants removed a year

5,206 Gallons of runoff reduced a year

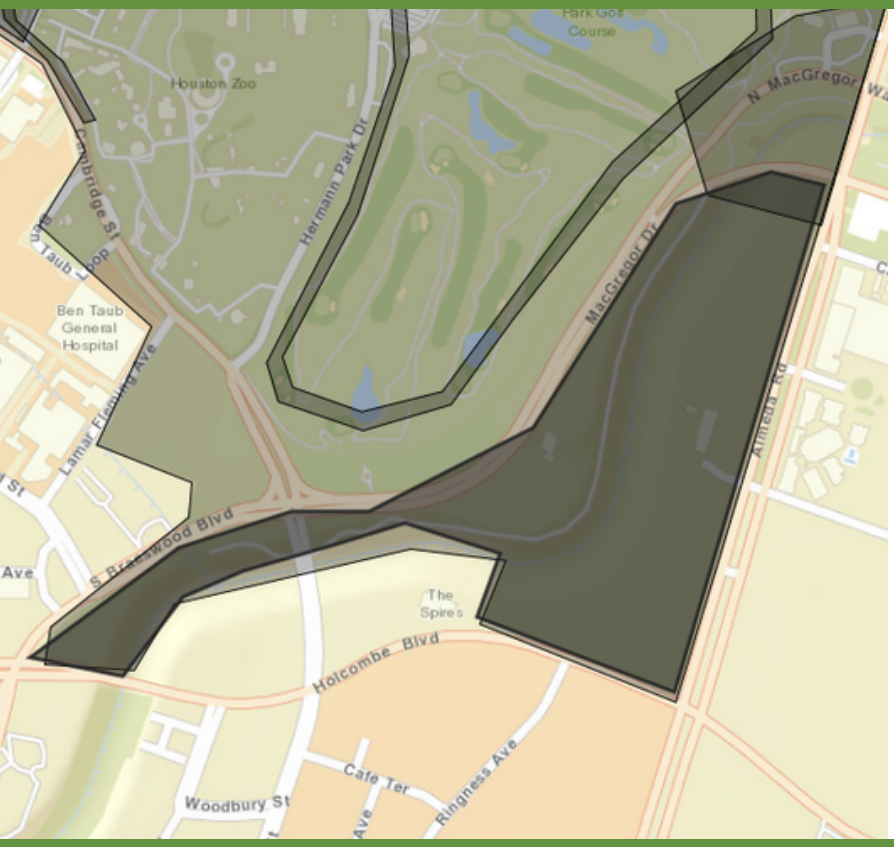
$613 decrease in pollutant related medical costs

$1,621 in energy savings due to reduced heat

122,879 pounds of carbon storage

CONTACT: MEGHAN MILLER 713-524-5876 EXT. 339 MMILLER@HERMANNPARK.ORG

HERMANN PARK
BAYOU PARKLAND



Project Summary

Project Area	108 acres
Existing Canopy	13%
Canopy Increase	5 acres
Project Cost	$300,000
Area density index	90
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Hermann Park is a high profile destination southwest of downtown Houston, attracting a large number of visitors each year. The Bayou Parkland area of Hermann Park consists of approximately 10 acres of overgrown invasive trees and underbrush. At this time, these areas are not used by park visitors due to the overgrowth of invasive species. Removing invasive plants would allow both people and wildlife to appreciate and prosper in a uniquely large dense green space located in a heavily urbanized area of Houston. Approximately 1000 trees will be added or will replace existing invasives.

Within the dense invasive vegetation are remnant landforms which existed prior to the channelization of Brays Bayou. Project partners include the City of Houston Parks and Recreation Department, Hermann Park Conservancy, and private donors.

Select Benefits

145 Pounds of air pollutants removed a year

5,206 Gallons of runoff reduced a year

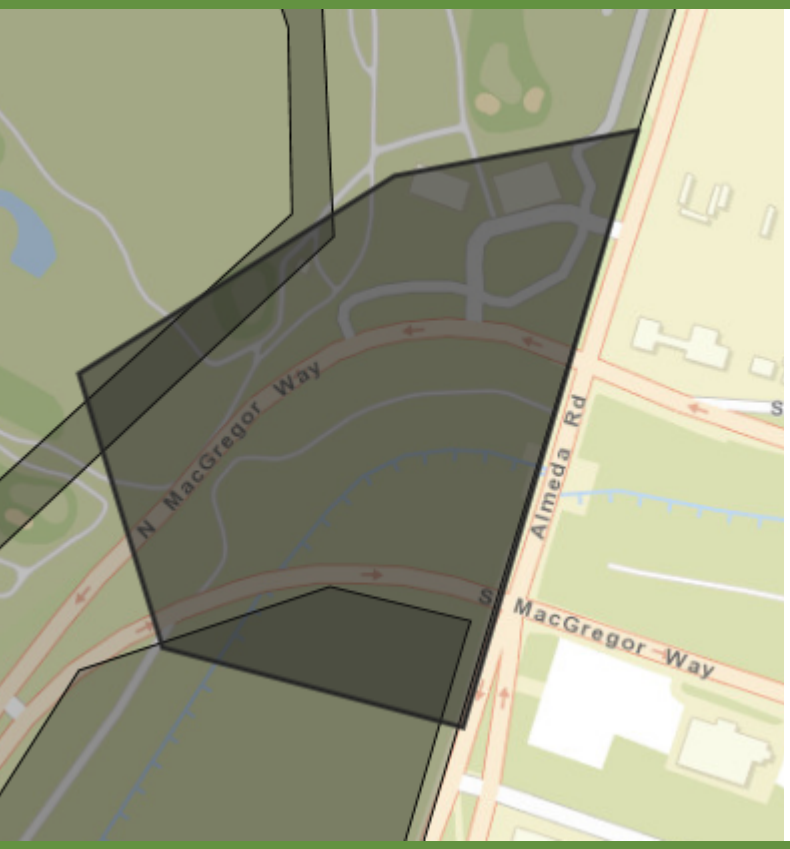
$613 decrease in pollutant related medical costs

$1,621 in energy savings due to reduced heat

122,879 pounds of carbon storage

CONTACT: MEGHAN MILLER 713-524-5876 EXT. 339 MMILLER@HERMANNPARK.ORG

HERMANN PARK
EAST PORTAL



Project Summary

Project Area	30 acres
Existing Canopy	17%
Canopy Increase	5 acres
Project Cost	$200,000
Area density index	84
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Hermann Park is a high profile destination southwest of downtown Houston, attracting a large number of visitors each year. The Almeda bridge, forming the east portal to the park over Brays Bayou, is the most heavily traveled access point into Hermann Park. It is also a significant entrance into the Texas Medical Center. The Almeda bridge is scheduled for replacement as part of the Harris County Flood Control District Project Brays improvements. As the bayou slopes are laid back and the bridge is lengthened, significant soil grade changes will negatively impact or remove existing trees.

The project will include connections to current and proposed natural drainage systems within Hermann Park. A goal is to create upland and lowland forest areas where little currently exist. An estimated 500 trees will be added as part of this project.

Select Benefits

73 Pounds of air pollutants removed a year

2,603 Gallons of runoff reduced a year

$307 decrease in pollutant related medical costs

$810 in energy savings due to reduced heat

61,440 pounds of carbon storage

CONTACT: MEGHAN MILLER 713-524-5876 EXT. 339 MMILLER@HERMANNPARK.ORG

HERMANN PARK
CARRIAGE PATHWAYS AND HERMANN PARK DR.

Project Summary

Project Area	178 acres
Existing Canopy	23%
Canopy Increase	5 acres
Project Cost	$300,000
Area density index	88
Adjacent to impaired water?	No
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Hermann Park is a high profile destination southwest of downtown Houston, attracting a large number of visitors each year. Some of the roadways and bike/pedestrian paths around and within Hermann Park were lined with trees in the early decades of the 20th century. Some of these transportation corridors were not planted or suffered canopy loss due to many reasons since installed.

The goal of this project is to complete the planting of the corridors and to infill where original trees did not survive. Several of the transportation corridors are on the City of Houston Bike Plan. Trees planted in transportation corridors provide many benefits because these trees are in concentrated areas of human activity. Low impact design elements are planned for many of these areas to improve natural drainage systems, habitat, and to provide educational opportunities for the large numbers of school children visiting the park. Approximatley 500 trees will be planted or replaced as part of this project.

Select Benefits

73 Pounds of air pollutants removed a year

2,603 Gallons of runoff reduced a year

$307 decrease in pollutant related medical costs

$810 in energy savings due to reduced heat

61,440 pounds of carbon storage

CONTACT: MEGHAN MILLER 713-524-5876 EXT. 339 MMILLER@HERMANNPARK.ORG

HERMANN PARK
PARK-WIDE TREE CARE

Project Summary

Project Area	534 acres
Existing Canopy	18%
Canopy Increase	10 acres
Project Cost	$250,000
Area density index	90
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

Hermann Park is a high profile destination southwest of downtown Houston, attracting a large number of visitors each year. Over 6,000,000 visitors walk, ride, or move in Hermann Park. This constant activity has negatively impacted physical soil properties in many areas of the park. Changing soil conditions has resulted in existing tree mortality and many areas are too impacted to support new tree planting.

This project proposes to improve soil conditions and remove tree limb die-back associated with impacts to the rooting zones. Improvement of soil conditions will increase water absorption and water holding capacities of the soil. One aspect of this project is to explore new means and methods utilized in other areas of the country which also manage impacts to rooting zones in high traffic areas.

An estimated 1,000 trees will be planted to replaced as part of this project.

Select Benefits

145 Pounds of air pollutants removed a year

5,206 Gallons of runoff reduced a year

$613 decrease in pollutant related medical costs

$1,621 in energy savings due to reduced heat

122,879 pounds of carbon storage

CONTACT: MEGHAN MILLER 713-524-5876 EXT. 339 MMILLER@HERMANNPARK.ORG

CITY OF PASADENA
SPENCER/SPACE CITY PARK

Project Summary

Project Area	74 acres
Existing Canopy	4%
Canopy Increase	1 acres
Project Cost	$250,000
Area density index	42
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

The City of Pasadena is a dynamic, growing community in the southeast of the Greater Houston metropolitan area. Adjacent to Bliss Meadows Park, a series of retention basins retains stormwater within the Armand Bayou watershed.

As part of park and trails planning activities, the City is planning to enhance the retention basins into a full park and trailhead. The enhanced park area will be considered for future connection to the City's trail system.

Approximatley 250 trees will be added as part of this project. Additional canopy in this area will likely be of benefit to improve water quality, reduce stormwater runoff, improve recreational opportunities, and reduce air quality issues.

Select Benefits

36 Pounds of air pollutants removed a year

1,301 Gallons of runoff reduced a year

$153 decrease in pollutant related medical costs

$405 in energy savings due to reduced heat

30,720 pounds of carbon storage

CONTACT: MIKE MAKI 713-475-7822 MMAKI@CI.PASADENA.TX.US

HOUSTON AREA URBAN FORESTRY COUNCIL ANNUAL TREE-PLANTING COMPETITION

Project Summary

Project Area	538 acres
Existing Canopy	7%
Canopy Increase	10 acres
Project Cost	$92,000
Area density index	21
Adjacent to impaired water?	No
Includes floodplain?	No
Adjacent to major roadway?	Yes
Economic equity area?	Yes
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

The Houston Area Urban Forestry Council (HAUFC) was formed in 1986 with the mission of providing a forum where the different interests involved in urban forestry could come together to develop programs for an enhanced urban forest in the greater Houston area.

This association of forestry management professionals and other interested parties holds an annual tree planting competition event at several locations throughout the urban areas of Greater Houston. Teams of volunteers compete to plant the most trees to benefit local urban forestry efforts.

This project includes two years of the planting competition. The first year will be held at a Harris County Flood Control's detention basin in northwest Houston, and the second year will be held at Buffalo Run park in Missouri City (pictured above). Approximately 2000 trees are planted each year at these events.

Select Benefits

51 Pounds of air pollutants removed a year

20,824 Gallons of runoff reduced a year

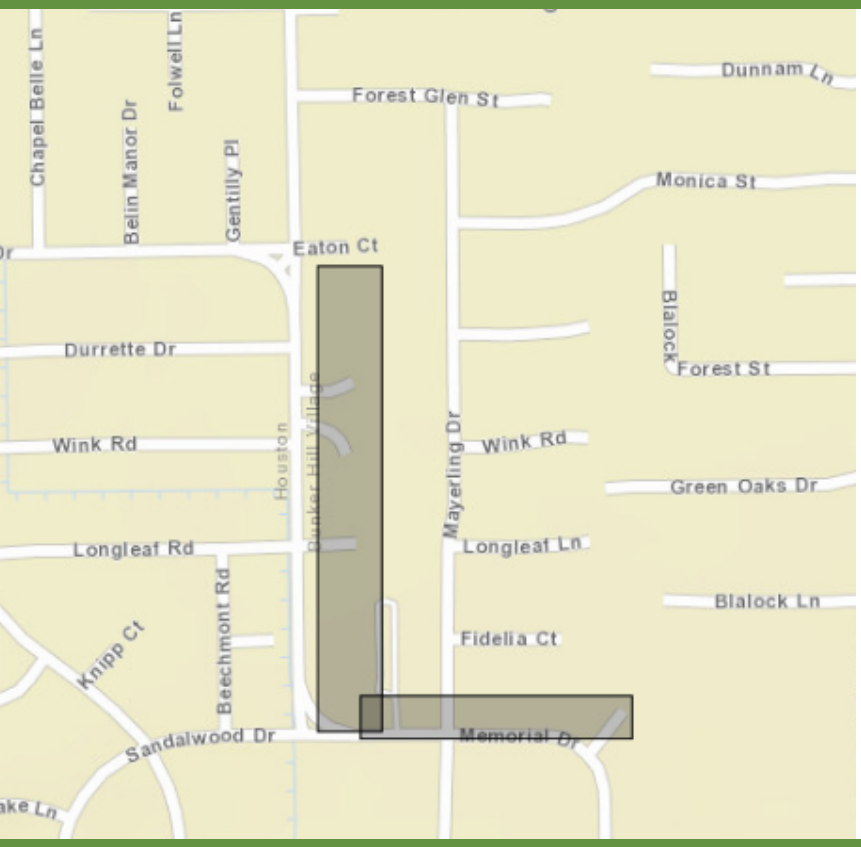
$2,453 decrease in pollutant related medical costs

$6,484 in energy savings due to reduced heat

491,518 pounds of carbon storage

CONTACT: PAUL WIERZBICKI 281-403-8645 PWIERZBICKI@MISSOURICITYTX.GOV

CITY OF BUNKER HILL VILLAGE
ARBOR WALK



Project Summary

Project Area	38 acres
Existing Canopy	42%
Canopy Increase	2 acres
Project Cost	$45,000
Area density index	23
Adjacent to impaired water?	No
Includes floodplain?	No
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	No
Public access/benefit?	Yes/Yes

Project Description

The City of Bunker Hill Village is a separate community located interior to the City of Houston. This established municipality is known for its established residential and right of way trees. Impacts of weather events and other causes have degraded trees along some street corridors.

The City previously established a walking trail for its citizens. In 2013 a Beautification Committee was started with limited funds. One of the top priorities was to re-establish the City's canopy of street / trail trees. An Arbor Walk was established along the trail system in selected areas of the City. This project would continue that effort in areas that are barren of trees as a result of past weather conditions including drought, hurricanes, flooding, etc.

The project would add approximately 25 trees and associated infrastructure to this urban streetscape.

Select Benefits

4 Pounds of air pollutants removed a year

130 Gallons of runoff reduced a year

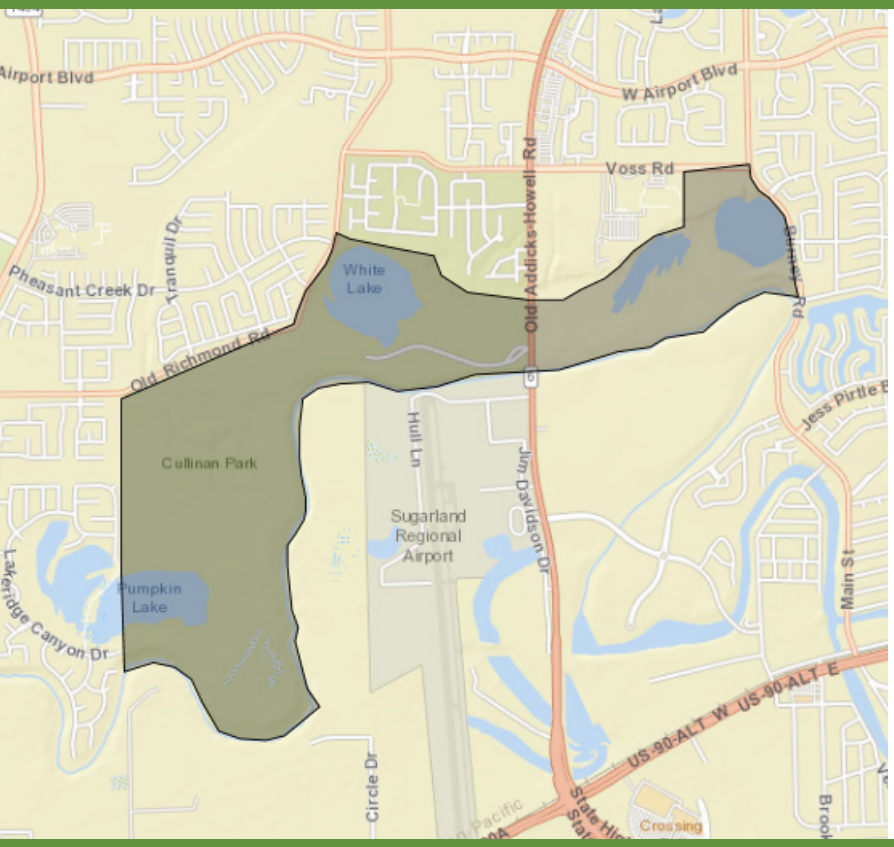
$15 decrease in pollutant related medical costs

$41 in energy savings due to reduce heat

3,072 pounds of carbon storage

CONTACT: KAREN GLYNN 713-467-9762 KGLYNN@BUNKERHILLTX.GOV

CITY OF SUGAR LAND
CULLINAN PARK / GANNOWAY PARK



Project Summary

Project Area	1005 acres
Existing Canopy	57%
Canopy Increase	1.2 acres
Project Cost	$9,000
Area density index	21
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	Yes
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

The City of Sugar Land is a rapidly growing municipality in Fort Bend County, southwest of the core of the Houston area. Sugar Land has two major waterways: the Brazos River and Oyster Creek. As a result of fast growth of Sugar Land, many developments are located near the two waterways, which have been impacted by major flood events, especially during Hurricane Harvey. City of Sugar Land has planned or constructed regional or community parks/parkland in those areas. The Cullinan Park/Gannoway Lake area in the northern part of Sugar Land has existing forest and recreation and is an important area for flood reduction and water quality upstream of the City's surface water plant.

There are many opportunities to reduce invasive species, add native trees, establish more native wildflower/ornamental grass understory vegetation and reduce mowing areas. This project is also close to major highways including Highway 59 (I-69) and Highway 6 which will benefit tremendously on cleaner air from the added tree canopies. This area is well connected and has a large size which provides significant wildlife habitat and migration corridors. The project will add an estimated 300 (to 600) trees.

Select Benefits

44 Pounds of air pollutants removed a year

1,562 Gallons of runoff reduced a year

$184 decrease in pollutant related medical costs

$486 in energy savings due to reduced heat

36,864 pounds of carbon storage

CONTACT: FENGLIN DU 281-275-2905 FDU@SUGARLANDTX.GOV

CITY OF SUGAR LAND
BRAZOS RIVER CORRIDOR

Project Summary

Project Area	915 acres
Existing Canopy	32%
Canopy Increase	1.2 acres
Project Cost	$9,000
Area density index	14
Adjacent to impaired water?	Yes
Includes floodplain?	Yes
Adjacent to major roadway?	Yes
Economic equity area?	No
Adjacent to existing habitat?	Yes
Public access/benefit?	Yes/Yes

Project Description

The City of Sugar Land is a rapidly growing municipality in Fort Bend County, southwest of the core of the Houston area. Sugar Land has two major waterways: the Brazos River and Oyster Creek. As a result of fast growth of Sugar Land, many developments are located near the two waterways, which have been impacted by major flood events, especially during Hurricane Harvey. City of Sugar Land has planned or constructed regional or community parks/parkland in those areas. The Brazos River Corridor area in the southern part of Sugar Land has existing forest and recreation and is an important area for Sugar Land's expanding population.

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Select Benefits

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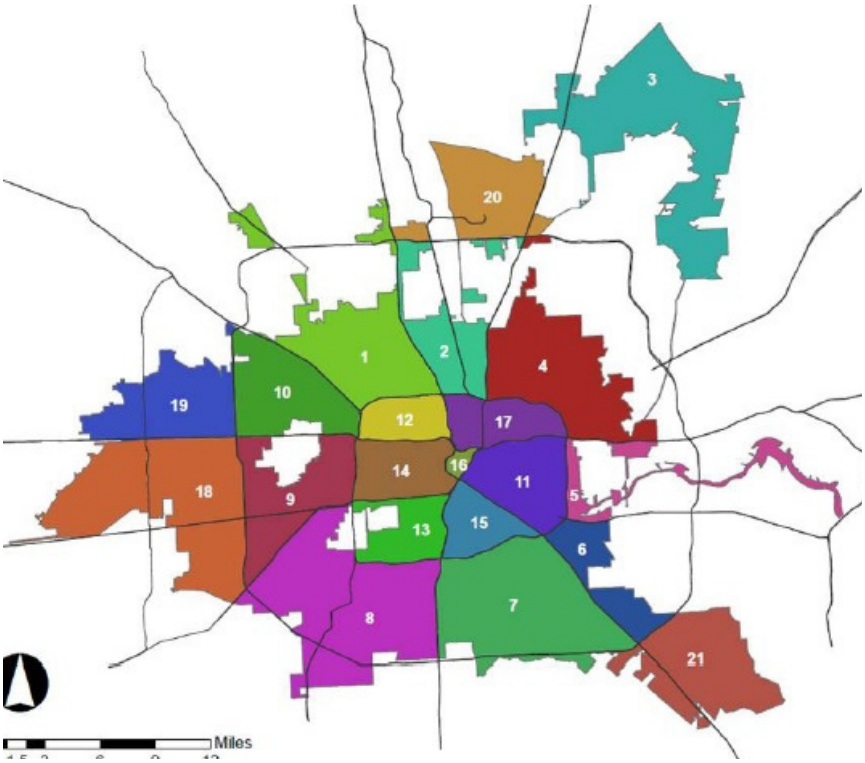
CITY OF HOUSTON
COMMUNITY RELEAF MASTER PLAN



Project Summary

Project Area	City Parks
Existing Canopy	Variable
Canopy Increase	See Description
Project Cost	$2,000,000
Area density index	Variable
Adjacent to impaired water?	Variable
Includes floodplain?	Variable
Adjacent to major roadway?	Variable
Economic equity area?	Variable
Adjacent to existing habitat?	Variable
Public access/benefit?	Yes/Yes

Project Description

The City of Houston is interested in completing a tree canopy assessment based on each park sector as described in the Houston Parks and Recreation Department (HPARD)'s Master Plan (at: http://www.houstontx.gov/parks/masterplan.html.)

The City is interested in completing this full assessment to help guide future planting events and resources based on the priority areas identified on the Houston Community ReLeaf Master Plan.

The project will guide the eventual planting of approximately 20,000 trees. However, this cost is not inclusive of those plantings. This project is a data/assessment effort.

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A region characterized by a healthy, diverse, and sustainable network of urban forests providing social, economic, environmental, and quality of life benefits for all its residents.

-Vision Statement

Houston Area Urban Forests

www.houstonforests.com