San Antonio Area Foundation
Where Giving and Community Connect

THE URBAN FOREST

STATEMENT OF THE ISSUE

Urban forests are "ecosystems of trees and other vegetation in and around communities that consist of street and yard trees, vegetation within parks and along public rights of way and water systems." Urban forests provide important environmental benefits in communities – among them improved air and water quality and the ability to manage stormwater runoff. Yet, unlike forests in natural settings, human intervention plays an important role in the existence and maintenance of urban forests. Urban expansion, land development and invasive pests threaten the existence of urban forests.

In fact, tree canopy – or the area of land covered by tree crown (the leafy and woody components of a tree) when viewed from above – has declined significantly over the last few decades in many U.S. metropolitan areas. Analyses conducted by American Forests, a nonprofit conservation organization dedicated to protecting and restoring healthy forest ecosystems, suggests that some naturally-forested areas of the country have lost 25% of their tree canopy cover in the last 15 years while, at the same time, these areas have seen impervious surfaces increase about 20%. This is significant because many of the benefits of the urban forest are tied to tree canopy cover. Moreover, the decline in the urban forest coupled with the increase in impervious areas threatens air and water systems and has ecological and economic implications for cities.

IMPERVIOUS ELEMENTS

Buildings, streets and parking lots make up a city's impervious elements. Unable to penetrate these impervious surfaces during rainstorms, rainwater runs-off roofs, parking lots and streets and into sewer and stormwater management systems rather than being absorbed into the ground. This means that even small storms can cause flash flooding. According to some studies, impervious elements in urban areas have resulted in more than $100 billion in additional costs to taxpayers for stormwater management. Moreover, as stormwater flows over these surfaces, it becomes contaminated with surface pollutants that may be carried into nearby streams or waterways.

In addition to stormwater runoff, pavement, buildings and other impervious hardscapes absorb and trap the sun's heat, reflect it back into the environment and raise temperatures in urban areas – an effect known as island heat. As a result, temperatures in some city centers are five to nine degrees warmer than in the surrounding countryside. Island heat produces a number of negative effects such as:

➢ Increased demand for cooling, which increases energy consumption and places additional pressure on city electricity grids during peak summer months
➢ Elevated air pollutant and greenhouse gas emissions from power plants due to increased energy consumption
➢ Increased incidents of heat exhaustion, respiratory difficulty and general discomfort resulting from air pollution and warm temperatures that compromise the health and comfort of city dwellers and visitors.

BENEFITS OF THE URBAN FOREST

Urban forests provide substantial environmental and economic benefits that offset stormwater runoff and the island heat effect:

➢ Trees capture rainwater on leaves, branches and trunks. Urban forests help absorb excess rainwater and redirect it into the supply of ground water helping to reduce the total amount of stormwater runoff that must be managed and stored in urban areas. Tree roots allow stormwater to soak into the soil, which helps to filter out and prevent contaminants from entering groundwater sources.

> Trees improve air quality. By reducing energy demand, trees reduce the production of associated air pollution and greenhouse gas emissions. They also remove air pollutants and help store carbon dioxide. Experts estimate one acre of forest absorbs six tons of carbon dioxide and emits four tons of oxygen – equivalent to the annual needs of 18 people.

> Urban forests mitigate the urban island heat effect. Strategically-placed trees absorb sunlight and provide shade that reduces the amount of sunlight reaching concrete and asphalt services, which reduces the island heat effect.

> Trees help reduce energy expenses related to cooling and heating buildings. Researchers have found that planting trees or vines on the west-side is typically most effective for cooling a building. The shade they provide can reduce building cooling costs by as much as 30%. During cooler months, trees minimize snow accumulation, serve as wind barriers and reduce heating costs by 20 to 50%.

THE URBAN FOREST IN SAN ANTONIO

Locally, American Forests used satellite imagery to conduct an Urban Ecosystem Analysis for San Antonio and issued reports of the findings in 2002, 2003 and 2009, respectively. According to the 2003 report, heavily forested areas of the city (areas with 50% or more tree canopy cover) declined by 22% from 1985 to 2001 and, at the same time, the city had a 22.3% population increase. The decrease in tree canopy impacted the urban forest's natural ability to mitigate environmental impacts. In 1985, as an example, the tree canopy absorbed 3.7 million more pounds of air pollutants per year than in 2001.

In a subsequent report, American Forests noted that while San Antonio's overall tree canopy cover (38%) exceeds that of many other cities and provides substantial ecological and economic benefits to the city, it falls short of the 40% recommended by American Forests. To meet the recommended tree canopy cover, the city must plant an additional 454,600 trees. American Forests recommends that the city of San Antonio adopt citywide tree canopy goals, implement a campaign to help the public understand the relationship between tree canopy and the environment, encourage citizens to plant trees on their property and use green technology to document the benefits provided by the urban forest.

MODEL PROGRAMS THAT PROMOTE URBAN FORESTS AND TREES

TreeFolks, a nonprofit organization in Austin, TX that promotes urban forestry practices, has planted 250,000 trees at Central Texas schools, parks and community gardens. These trees help cool the air, minimize stormwater runoff, shade residential areas and improve the quality of local waterways. Through its many initiatives, TreeFolks plants native, drought resistant trees, distributes up to 4,000 free "street trees" to area residents and gives away thousands of free saplings to encourage fall-tree planting. Some programs occur in partnership with the City of Austin's Urban Forestry Program. http://www.treefolks.org/programs/

L.A. Cool Schools is a school-based, community tree planting program in Los Angeles, California that seeks to plant almost 9,000 trees at over 100 schools. Students, teachers, parents and school administrators form "Green Teams" that design a plan to plant trees on a school campus. The program promotes community pride and creates awareness of the benefits of trees while producing natural shade that reduces air conditioning usage and energy consumption on school campuses. A review of the program found that for each dollar spent on the program, $2.37 was returned to the school in the form of reduced energy expenses, improved air quality and increased property value. http://www.bwhaonline.org/uploads/6/0/9/3/6093311/ladwp_home_tree_guide.pdf

Trees Atlanta in Atlanta, Georgia has improved the city's urban forest by planting and conserving trees and educating the public about the benefits of maintaining and expanding the natural tree canopy. Founded in 1985, Trees Atlanta involves residents in tree planting and maintenance projects and ensures that trees are planted in low-income and high-need tree canopy areas. Since its inception, Trees Atlanta has added over 96,000 trees to

the city and green areas have increased by up to 30% in some areas which has helped lower summer temperatures by several degrees. http://treesatlanta.org/our-programs/

LOCAL PROGRAMS

Alamo Forest Partnership was established in 2000 to plant and conserve trees as well as to jointly sponsor the Urban Ecosystem Analysis for Bexar County. The Partnership increases community awareness of the value and proper care of trees, educates the public regarding healthy ecosystems and tree placement, maintains a tree inventory and monitors new tree planting and placement, promotes tree selection and planting to conserve energy, improves air quality and reduces rainwater runoff. The Partnership sponsors an annual regional urban forest conference and the Arbor Day Celebration on the first Saturday of November. http://alamoforestpartnership.org/default.htm

The City of San Antonio Parks and Recreation Department partnered with City Public Service Energy, San Antonio Water System and the Texas Forest Service to implement the Green Shade Tree Program -- a tree rebate program for commercial and residential customers. Through the program, CPS Energy customers receive a rebate of $50 per tree for up to three trees. Trees must be selected and strategically-placed according to guidelines to reduce energy usage. Funded by an American Recover & Reinvestment Act Energy Conservation Block Grant, the city seeks to add 7,000 new trees in the area through this effort. http://www.sanantonio.gov/parksandrec/tree.aspx

ADDITIONAL READING

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 "Urban Ecosystem Analysis Phase 2: Data for Decision Making San Antonio, TX". (2003). American Forests. http://www.alamoforestpartnership.org/images/SanAntonioPhase2_final.qxd1.pdf

"Urban Ecosystem Analysis San Antonio, Texas: Calculating the Value of Nature". (2009). American Forests. http://www.systemecology.com/4_Past_Projects/SanAntonio_low%20res%20final.pdf

"Planning the Urban Forest: Ecology, Economy, and Community Development." Urban Forest Assessment Resource Guide. American Planning Association. http://www.americanforests.org/wp-content/uploads/2013/06/Click-here-to-download-the-Urban-Forest-Assessments-Resource-Guide-as-a-PDF-3.pdf

Vibrant Cities and Urban Forests: A National Call to Action - http://urbanforestcoalition.org/doc/Vibrant%20Cities%20Report_V2.pdf

ADDITIONAL RESOURCES

Arbor Day Foundation - http://www2.arborday.org/generalinfo/about.cfm

National League of Cities Sustainable Cities Institute – http://www.sustainablecitiesinstitute.org/view/page.home/home

Sustainable Urban Forests Coalition - http://www.urbanforestcoalition.com/

Texas A&M Forest Service - http://txforestservice.tamu.edu/main/default.aspx

Texas Chapter International Society of Arboriculture - http://www.isatexas.com/

Texas Urban Forestry Council - http://texasurbantrees.org/

U.S. Department of Agriculture Forest Service - http://www.fs.fed.us/index.shtml

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Los Angeles Department of Water & Power. (2005). "Home Tree Guide: Using Shade Trees to Save Energy and Money and Beautify Your Home's Surroundings." http://www.bwhaonline.org/uploads/6/0/9/3/6093311/ladwp_home_tree_guide.pdf (accessed December 26, 2013).

National League of Cities Sustainable Cities Institute. "Benefits of Trees & the Urban Forest." http://www.sustainablecitiesinstitute.org/view/page.basic/class/feature.class/Lesson_Benefits_Urb_Forest_Tres (accessed December 15, 2013).

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"Tree Basics: Our Community Trees." http://www.sactree.com/assets/files/greenprint/toolkit/c/Athens-ClarkeTreeBasics.pdf (accessed December 26, 2013).

TreeFolks. (2014). "Programs." http://www.treefolks.org/programs/ (accessed December 22, 2013).

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Urban Forest Management Plan. (2014). "Toolkit." http://ufmptoolkit.com/trees-canopy-cover.htm (accessed December 26, 2013).

United States Environmental Protection Agency. "Trees and Vegetation." http://www.epa.gov/hiri/mitigation/trees.htm (accessed December 22, 2013).

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