



# Livable Communities and Urban Forests

**T**he trees in our parks, yards, public spaces and streetscapes – our “urban forests” – play a vital role in the health and economic vitality of our communities. Trees affect the quality of the air and water where we live, the cost of heating and cooling our homes and businesses, property values, and ultimately, the safety and desirability of our neighborhoods and downtowns.

Unfortunately, in recent years urban trees have fallen victim to “downsizing” in the face of shrinking municipal budgets. Aging trees are removed but not replaced, while new plantings are restricted to small trees to save on maintenance costs. While this strategy may produce some short-term savings, it fails to take into account the broader and long-term benefits that residents, businesses and community visitors seek – clean air, clean water, and safe and attractive places.



## ECONOMIC DEVELOPMENT

### Trees stimulate downtown business

Trees help merchants enjoy greater sales and cities reap greater tax revenues. University of Washington studies found that consumers will shop more often and longer in downtown business districts with street trees and other landscaping than in districts without; and they are willing to pay more for parking and up to 11% more for goods and services. [2]

### Trees influence residential property values

Developers can maximize profits by retaining existing trees and replanting trees following construction. Research comparing residential sale prices show that people are willing to pay 3-7% more for properties with ample trees versus those with few or no trees. According to one of the most comprehensive studies

### Are trees worth the cost?

**S**tudies have shown that urban trees provide benefits worth many times the cost of their planting and upkeep. Indeed, in most areas of the country, communities can care for their largest trees for as little as \$13 per tree per year, according to the Center for Urban Forest Research. And each tree returns an average of \$65 in energy savings, cleaner air, better managed stormwater, extended life of streets (shaded streets require resurfacing less often), and higher property values. [1]

### Money grows on Philadelphia trees

**P**lanting trees within 50 feet of houses in the Kensington area of Philadelphia increased home prices by about 9%, or \$3,400, according to a recent University of Pennsylvania study. The study, based on analysis of over 3,000 home sales, also found that sale prices rose as much as 30% when the homes were located next to vacant lots that had been cleaned and greened. This amounted to a \$4 million boost in property value through tree plantings and a \$12 million gain through lot improvements. [3]

of the influence of trees on residential property, an analysis of prices in one city found that each large front yard tree added about 1% to a home’s resale value and an estimated increase of \$100,000 (1978 dollars) in property tax revenues. [4]

# Trees and healthy communities

## ENVIRONMENTAL BENEFITS



### Trees improve climate and save energy

**R**apid urbanization during the past 50 years has been associated with increases in downtown temperatures of nearly 1° F per decade – largely due to the increase in exposed heat-absorbing surfaces, such as dark rooftops, parking lots and streets. As temperatures increase, energy demand for cooling increases, as do carbon dioxide emissions (a heat-trapping gas that causes global warming) from fossil-fuel power plants, municipal water demand, unhealthy smog levels, and human discomfort and disease. [5]

Neighborhoods with well-shaded streets can be up to 10° F cooler than neighborhoods without street trees. Three well-placed trees around a home can lower air conditioning bills by up to 30%, and windbreak trees can save up to 25% on winter heating costs. [6]

### Trees clean the air

**T**rees remove pollutants from the air. They store carbon dioxide in their leaves, branches, trunks and roots. They absorb sulfur dioxide and nitrogen oxide, two major components of acid rain and ozone pollution. They intercept particulate matter, such as dust, ash, pollen and smoke, while releasing oxygen into the air through photosynthesis.

Research shows that 100 trees can remove five tons of carbon dioxide from the atmosphere per year, and can remove about 1,000 pounds of pollutants per year, including 400 pounds of ozone and 300 pounds of particulates. [7]

### In Davis, trees clean the air

**T**rees in a Davis, CA, parking lot cleaned the air by reducing temperatures 1-3° F, according to the Center for Urban Forest Research. By shading asphalt surfaces and parked cars, trees reduce hydrocarbon emissions from gasoline that evaporates from leaky fuel tanks and worn hoses. These emissions are a principal component of smog, and parked vehicles are a primary source. Planting trees in parking lots throughout the region could reduce hydrocarbon emissions comparable to the levels achieved by the local air quality district's currently funded programs (e.g., graphic arts, waste burning and vehicle scrappage). [8]



### Trees prevent erosion and reduce runoff

**T**ree roots hold soil in place while tree canopies reduce the force of falling raindrops on barren surfaces - which prevent erosion. Trees also catch and hold rainfall – both of which can delay runoff and reduce flooding. Root growth and decomposition enable the ground to absorb more water, which also reduces flooding and helps replenish groundwater, a critical water source for many communities. Studies that have simulated urban forest effects on stormwater report annual runoff reductions of 2-7%. [9]

Seattle's roadside tree-planted drainage areas keep pollutants from washing into waterways.



On which street would you drive faster? Narrow tree-lined streets slow traffic and cool neighborhoods, encouraging more people to bike, walk and meet their neighbors.

## PUBLIC HEALTH AND SAFETY

### Trees calm traffic and encourage walking

**A** treeless street can encourage higher speeds, increasing the frequency and severity of accidents.

Street trees provide both visual interest and obstacles near the road edge, which encourage safe speeds and quieter neighborhoods. Closely spaced trees help motorists gauge and control their speeds. Narrower streets combined with street trees also slow drivers down, while maximizing shading of heat-absorbing asphalt. Trees planted between the curb and sidewalk improve safety by adding a buffer between moving vehicles and pedestrians.

### Seattle trees aid natural drainage

**S**eattle is redesigning residential streets with natural drainage systems by replacing paved street edges with tree-planted vegetated swales, cascades and small wetland ponds. This allows stormwater to be absorbed into the ground instead of being channeled at high velocities with pollutants into local waterways. Testing suggests that runoff was reduced by 98% over a two-block wide area over the first two years, with a similar reduction in the transmission of pollutants.

The City is also finding that natural drainage is 25% cheaper to build than conventional roadside development. In addition, these plants and trees not only maintain themselves, but their effectiveness increases as they grow. [10]

### Trees reduce crime and increase social ties

**T**rees can play an important role in reducing crime rates and domestic violence. In a study of Chicago public housing residents, University of Illinois researchers found that buildings with high levels of greenery had 52% fewer property and violent crimes than apartment buildings with little or no vegetation.

Why? Green spaces draw people outdoors, increasing surveillance and discouraging illegal activity. The green and groomed appearance of an apartment building is a signal that owners and residents care about a property, and watch over it and each other.

Greener common areas also facilitated stronger social ties. The more trees and grass in the common spaces, the more those spaces were used by residents. Those living closer to green spaces enjoyed more social activities, had more visitors, knew more of their neighbors, and reported committing fewer acts of aggression toward household members than those living near barren spaces. [11]

### Other health benefits

- ✓ Noise can reach unhealthy levels in cities. Trees reduce noise pollution by acting as a buffer and absorbing urban noise, especially high-frequency sounds that are the most distressing to people.
- ✓ Trees reduce exposure to ultraviolet light from the sun, lowering the risk of skin cancer and cataracts.
- ✓ Research indicates that views of nature reduce the stress response of both body and mind when stressors of urban conditions are present, reducing aggression and increasing calm.
- ✓ Hospital patients with a view of trees have been shown to need less medication and have faster recovery times following surgery. [12]





## What local governments can do

- ✓ Require shade trees in new development.
- ✓ Require shade trees in parking lots.
- ✓ Retrofit streets with trees along street edges and in medians.
- ✓ Encourage residents and businesses to plant shade trees on private property.
- ✓ Adopt a tree preservation ordinance.
- ✓ Hire or appoint a City forester/arborist.
- ✓ Conduct a street tree inventory and establish and fund a maintenance program.
- ✓ Count trees as a public utility capital asset.
- ✓ Use tree planting to strengthen communities and increase resident involvement.
- ✓ Collaborate with local community groups and tree organizations.

## FOR MORE IDEAS

- ✓ Baton Rouge, Salt Lake City, Sacramento, Houston and Chicago are taking actions to preserve and expand their community forests. Learn more at [www.epa.gov/heatiland/index.html](http://www.epa.gov/heatiland/index.html).
- ✓ Learn about sustainability practices using trees and landscaping in Los Angeles at: [www.treepeople.org/trees](http://www.treepeople.org/trees).

## OTHER RESOURCES

- ✓ American Forests: [www.americanforests.org](http://www.americanforests.org)
- ✓ Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service: [cufu.ucdavis.edu](http://cufu.ucdavis.edu)
- ✓ Local Government Commission: [www.lgc.org/environment/trees.html](http://www.lgc.org/environment/trees.html)
- ✓ National Urban and Community Forestry Advisory Council: [www.treelink.org/nucfac](http://www.treelink.org/nucfac)
- ✓ TreeLink: [www.treelink.org](http://www.treelink.org)
- ✓ USDA Forest Service, Urban and Community Forestry Program: [www.fs.fed.us/ucf](http://www.fs.fed.us/ucf)
- ✓ Urban Forestry South, USDA Forest Service, Southern Region: [www.urbanforestrysouth.org](http://www.urbanforestrysouth.org)
- ✓ USDA Forest Service, Northeastern Research Station, Urban Forest Research Unit: [www.fs.fed.us/ne/syracuse](http://www.fs.fed.us/ne/syracuse)

## REFERENCES

1. The Large Tree Argument: The Case for Large-Stature Trees vs. Small-Stature Trees, Center for Urban Forest Research and Southern Center for Urban Forestry Research and Information, U.S. Forest Service, 2004.
2. Fact Sheets #5 and #17, Center for Urban Horticulture, University of Washington.
3. "Greening Up Fertilizes Home Prices, Study Says," Philadelphia Inquirer, Anthony S. Twyman, Jan. 10, 2005; "Wharton School Study Finds Greening Good Investment," The Pennsylvania Horticultural Society, November 2004.
4. Tree Guidelines for Inland Empire Communities, E.G. McPherson et al., Local Government Commission, 2001.
5. Ibid.
6. "Potential of Tree Shade for Reducing Residential Energy Use in California," Journal of Arboriculture, J.R. Simpson and E.G. McPherson, 22: 1, 1996; "Energy Savings With Trees." Journal of Arboriculture, G.M. Heisler, 12:113-125, 1986.
7. Tree Guidelines for San Joaquin Valley Communities, E. G. McPherson et al., Local Government Commission, 1999.
8. Tree Guidelines for Inland Empire Communities, E. G. McPherson et al.
9. Ibid.
10. "Using Nature's Plumbing to Restore Aquatic Ecosystems: The City of Seattle's Natural Drainage System," James N. Levitt and Lydia K. Bergen, The Report on Conservation Innovation, Fall, 2004.
11. Human – Environment Research Laboratory, University of Illinois at Urbana Champaign. For more information, visit [www.herl.uiuc.edu](http://www.herl.uiuc.edu).
12. Tree Guidelines for Inland Empire Communities, E. G. McPherson et al.



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Development of this factsheet was supported by the USDA Forest Service Urban and Community Forestry Program on the recommendation of the National Urban and Community Forestry Advisory Council.