

Benefits and Costs of Urban Forests				
Benefit	Reason	Concern	Notes	Stakeholder
Increase in property value	The value of houses in neighborhoods with trees is usually significantly higher than those with out. Green space increases property value. Preservation of trees during development may cost less than removal (1).	The cost of preserving trees and techniques for planning and protecting must be looked at in relation to long term benefits of increased property value (1).	People are willing to pay 3-7% more for properties with ample trees (2). Important to keep downtown neighborhoods vital, and reduce urban sprawl. Each large front yard tree was associated with a 1% increase in sale price (6).	Homeowners, city governments, developers
Decrease in energy costs	Shade - properly placed trees can reduce cooling cost Transpiration - converts liquid water to water vapor and thus cools by using solar energy Wind Speed Reduction - reduces infiltration of outside air into interior spaces (2).	Shade - Trees west of home can reduce AC costs by the greatest amount. In colder climates trees to the south of the home should be avoided. Wind - Conifers tend to have the greatest impact on reduction (1).	Two 25 ft. tall on the west side of a Denver home would save 9% annually on heating and cooling costs. Strategically planted trees can reduce heating and cooling costs for 20-25% per average household (2).	Homeowners / residents, Public works departments
Improvement in air quality	Trees directly sequester CO2 as woody and foliar biomass. Can reduce emissions from heating and cooling. Absorb Gaseous Pollutants. Intercept Particulate Matter. Release oxygen through photosynthesis. Transpires water and shades surfaces, which reduces heat island effect (1).	Vehicles, chain saws and other equipment release CO2. Trees release CO2 when living and then release all CO2 upon death (1).	6% tree canopy cover eliminated 1,080 tons of air pollutants, valued at \$5.3 million. Communities also benefit from reduced cost of implementing air pollution controls (2 &11). Shading asphalt and parked vehicles , the trees reduce hydrocarbon emission from cars with leaky gas tanks and faulty hoses. The evaporative emissions are a component of smog, and parked cars are a primary source (2).	Homeowners / residents, Public works departments, state government (reduction in EPA fines)

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Improvement In water quality	<p>Reducing storm water runoff and hydrology - Leaves and branch surfaces intercept and store rainfall. Root growth and decomposition increase rates and capacity of soil infiltration. Tree canopies reduce soil erosion. Transpiration through tree leaves reduces soil moisture (1).</p> <p>Waste water management - Irrigated nurseries and gardens can be a safe means of waste water treatment. Water reduction and power plants - trees that reduce demand for electricity also reduce demand for water. And thermal pollution of rivers is reduced (2).</p>	In many communities storm water run off has surpassed the capacity of storm water drainage systems - Raw sewage spill over (1).	Tree cover along the Front Range has been estimated to reduce runoff by \$3.2 million annually (2 & 11). Urban forests have been reported to reduce storm water run off by 2-7% (2). Broadleaf evergreens and conifers intercept more water than deciduous trees (2.) Waste water management - reused wastewater can recharge aquifers, reduce storm water treatment loads and increase sales for nurseries (2). Water reduction and power plants - Coal fired power plants use .6 gal per kWh of electricity (2).	Water management organizations, Public works departments, elected officials, nursery's / gardening organizations
Soil Erosion	Eliminate erosion by controlling storm water flow (1).	Erosion can be especially sever at construction sites (1). With increased standards for non-point source pollution storm water standards have become increasingly stringent and costly (2)		Public works department, water management organization, urban drainage
Creation of wildlife habitat	Provide food, water and shelter for wildlife. Increase biodiversity (1 & 2).	More wildlife = More issues between domesticated animals		Animals and residents
Retail setting	Consumer Surveys shows that people prefer to shop in tree-lined areas. Consumers also state that they are willing to pay more in for goods and services in well landscaped businesses districts (2 &			Store owners, local governments
Decrease In violence	Less violence occurs in public housing where there are trees. (2 & 4)	Perceived increased hiding places for potential criminals	Cost may increase to protect trees from vandalism in lower income communities.	Homeowners / residents, police officers

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Social and psychological benefits	Increase in recreation opportunities. Improvement in health and well being. Soothing influence of trees can help reduce stress levels. After storms people often report a sense of loss from destruction of urban forest (2 & 7). The act of planting trees can also have a social value on a community (2).		Desk workers with views report less illness and claim to have better focus thought other work day.(2 & 8)	
Human Health benefits	Trees in cities provide public health benefits and improves the lives of those who live and work in the city (2).		Hospital patients need less medicine and sleep better when they have access to the outdoors or views of trees (2 & 9). Trees reduce exposure to UV rays reducing the risk of skin cancer and cataracts (2 &10).	
Noise reduction	Noise can reach unhealthy levels in cities, from plains, trains and highways. Plants absorb high frequency sounds, high frequency is more distressing to people (2).		Trucks, trains and planes can produce noise= greater than 100 decibels, which is 2x the level considered to be a health risk (2). Thick strips of vegetation and land forms can reduce noise levels by 6-15 decibels (2).	
Increase in job opportunities	Provide jobs for skilled and unskilled labor. Also provide educational opportunities for the surrounding neighborhood (2).			Non-profit groups, municipal departments, schools.
Shade can defer street maintenance	Offset pavement management costs, by protecting pavement from weathering (2).	Most weathering of asphalt occurs in the first 5-10 yrs, when new street planting provides little shade, this benefit may apply when street trees are older (2).		Public works department, Planning department

Sources

- 1.) Urbanforestrysouth.org, (n.d.) Retrieved from http://www.urbanforestrysouth.org/Resources/Library/Citation.2004-07-20.1358/file_name
- 2.) http://cufr.ucdavis.edu/products/cufr_258.pdf
- 3.) McPherson and Mathis, 1999 4.) Sullivan and Kuo, 1996
- 5.) Wolf 1999
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Benefit	Reason	Concern	Notes	Stakeholder
6.) Anderson and Cordell 1988				
7.) Hull, 1992				
8.) Kaplan and Kaplan, 1989				
9.) Ulrich, 1985				
10.) Tretheway and Manthe, 1999				
11.) American Forests, 2001				

The Tree Project: Phase 1 Report

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APPENDIX F

Trees Cost/Benefits

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