

A photograph of a tree-lined path in a park. The path is paved and runs through a dense canopy of mature trees. Sunlight filters through the leaves, creating dappled shadows on the ground. A few people are visible on the path, including a person walking and a person pushing a stroller. A street lamp is visible on the left side of the path. The text "Urban Trees" is overlaid in the center in a bold, orange font. There are three small red squares in the top left and bottom right corners of the image.

Urban Trees



The Benefits of Trees

- Energy savings
- Reduce atmospheric carbon dioxide
- Improve air quality
- Reduce stormwater runoff
- Aesthetic and other amenities





Energy Savings

- Leaves absorb and/or deflect radiant energy from the sun during the summer months and allow filtered sunlight in the winter.
- Using heat energy from the air, water evaporates from leaf surfaces providing a cooling effect.
- “Trees properly placed around buildings can reduce air conditioning needs by 30% and can save 20-50% in energy used for heating.” · USDA Forest Service
- “Shade from trees could save up to \$175 per year (per structure) in air conditioning costs.” · Dr. Lowell Ponte





Reduce Atmospheric CO₂

- During photosynthesis, trees absorb carbon dioxide (for plant structure and function) while returning oxygen to the atmosphere.
- A single mature tree can absorb as much as 48lbs. of carbon dioxide per year · enough for 2 people. (1)
- “One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people.” · U.S. Department of Agriculture





Reduce Atmospheric CO₂

- “There are about 60 to 200 million spaces along our city streets where trees could be planted. This translates to the potential to absorb 33 million more tons of carbon dioxide every year, and saving \$4 billion in energy costs.” · National Wildlife Federation





Improve Air Quality

- In addition to the removal of atmospheric carbon dioxide, tree leaves also absorb other pollutants:
 - **ozone**
 - carbon monoxide
 - sulfur dioxide

- Air quality improvements in New York City due to pollution removal of trees during the daytime of the growing season averaged 0.47% for particulate matter, 0.43% for sulfur dioxide, 0.30% for nitrogen dioxide, 0.002% for carbon monoxide and **0.45% for ozone.** (3)





Improve Air Quality

- In 1994, trees in New York city removed an estimated 1,821 metric tons of air pollution - an estimated value to society of \$9.5 million. (3)
- The average pollution removal rates per m² of tree canopy cover for New York, Baltimore and Atlanta averaged 12.2g / m² / yr, with a range of 10.6g to 13.7g. (3)
- There is up to a 60% reduction in street level particulates with trees. (2)





Reduce Stormwater Runoff

- “The planting of trees means improved water quality, resulting in less runoff and erosion. This allows more recharging of the ground water supply. Wooded areas help prevent the transport of sediment and chemicals into streams.” · USDA Forest Service
- For every 5% of tree (canopy) cover added to a community, stormwater runoff is reduced by approximately 2%. (2)
- Tree roots also remove nutrients harmful to water ecology and quality.





Other Benefits

- Increased property values.
- “Healthy, mature trees add an average of 10% to a property’s value.” · USDA Forest Service
- Social / Behavioral benefits.
- “In laboratory research, visual exposure to settings with trees has produced significant recovery from stress within five minutes, as indicated by changes in blood pressure and muscle tension.” · Dr. Roger S. Ulrich, Texas A&M University





What About Dallas?

- Dallas needs to know what it has and how to proceed with managing its urban forest:
 - American Forests and CITYgreen software to determine loss of canopy cover, current conditions and future impacts based on different development scenarios
 - Sample survey of existing street and parkland trees
- Hire an urban forester to design and implement program to manage the city's urban forest





Hiring an Urban Forester

- Reasons for hiring an urban forester:
 - Ensure better training for the city's tree care crews.
 - Consideration for privatizing tree removal and focus the city's efforts on improving the quality of the pruning of public trees.
 - Education and outreach
 - Increase the number of public tree plantings projects.
 - inventory city park and street trees · maintenance schedule initially focusing on most severe hazards.





Consideration For Change

- Caliper inches versus canopy cover
 - currently, the city protects most species at 8” diameter and larger · if removed, replacement is caliper inch for caliper inch
 - most benefits of trees are quantified in terms of canopy cover (e.g. amount of shade; surface area and canopy density to capture rainfall, sequester carbon and cooling effects of transpiration, etc.)
 - many cities / states calculate canopy cover percentages for particular developments and will





Consideration For Change

only allow a certain percent reduction, as well as requiring new plantings estimated to provide enough new canopy cover to reach the desired percent canopy cover for the entire site within a set amount of time.

- Dallas should consider revising the landscape and tree preservation ordinance to address the issue of canopy cover rather than caliper inches, when it comes to the removal of trees and the replacement requirements.





References

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2. Coder, Dr. Kim D., “Identified Benefits of Community Trees and Forests”, University of Georgia, October, 1996.



3. Nowak, D.J. and Crane, D.E. In Press. The Urban Forest Effects (UFORE) Model: quantifying urban forest structure and function. In: Hansen, M. (Ed.) Second International Symposium: Integrated Tools for Natural Resources Inventories in the 21st Century. USDA Forest Service General Technical Report.