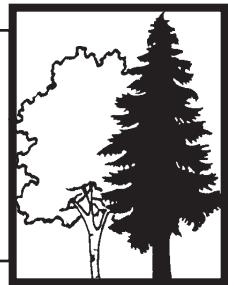


# Trees and Forests Improve the Urban Environment

Alaska Department of Natural Resources / Division of Forestry / Community Forestry Program  
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## Forests improve water quality

- Runoff from impervious surfaces increases flooding and is a major source of water pollution. Trees and soil work together to reduce stormwater runoff. Trees reduce stormwater flow by intercepting rain water on their leaves, branches, and trunks. This water evaporates back into the atmosphere, reducing the total amount of runoff that must be managed in urban areas. Trees also slow storm flow, reducing the volume of water that a containment facility must store. (American Forests)
- Runoff from forested areas is 17 percent less than from developed areas according to the U.S. Forest Service. This reduction in runoff saves thousands of dollars that would have to be spent for retention ponds, flood control projects, and other engineered solutions to stormwater management.
- Existing tree cover in the U.S. provides over \$400 billion dollars in storm water services to urban areas, based on an average 27 percent canopy cover. Increasing the urban tree cover to 40 percent nationwide would result in \$100 billion in additional stormwater management benefits.
- Trees lost to development in the Puget Sound region between 1973 and 1996 would have reduced stormwater storage requirements by 1.2 billion cubic feet, the equivalent of a \$2.4 billion stormwater management system. In 1996, the trees in the Puget Sound Area provided stormwater benefits worth \$5.9 billion.
- Following are **tree cover benefits** in four cities, based on a study by American Forests completed in 1997. The study measured the tree cover for each city, extending about three miles beyond city limits. The air quality benefits listed are on an annual basis. Stormwater benefits represent one-time capital costs to build retention facilities that provide the equivalent benefits of trees.

	Canopy Cover	Air Quality (per year)	Storm water
Atlanta	27 percent	\$15 million	\$883 million
Austin	34 percent	\$31 million	\$1.4 billion
Baltimore	31 percent	\$11 million	\$340 million
Milwaukee	18 percent	\$8 million	\$305 million

## Forests improve air quality

- Trees can improve air quality by removing pollutants and particulate from the air. Relatively large natural areas are needed to improve air quality. A multi-layered forest—soil, herbs, shrubs, trees—is more effective at reducing pollution than a single layer. The ultimate sink for pollution is the soil beneath the forest. Some pollutants lose toxicity when filtered by the forest.
- Researchers at the Lawrence Berkeley Laboratory determined that increasing the number of trees is by far the cheapest way to cut carbon dioxide pollution in our nations' cities.
- In 1996, the tree canopy in the Puget Sound Area provided air quality benefits worth \$166.5 million. Tree cover as it existed in 1972 would save an estimated \$266 million annually.
- A University of California study found that the cost of reducing CO<sub>2</sub> by one pound is 0.3 to 1.3 cents for planting a tree; 2.5 cents per pound by increasing the energy efficiency of appliances, and 10 cents per pound to build more fuel-efficient cars. According to American Forests, an acre of trees uses about 2.6 tons of carbon dioxide per year.
- A three-year study in Chicago found that the urban forest ecosystem provided air cleansing worth \$9.2 million in 1991.

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## **Trees conserve energy**

- Appropriate tree plantings around buildings can slow winter winds and reduce annual energy use for home heating by 4 to 22 percent.
- Tree shading can lower summer cooling costs by up to 20 percent.

## **Trees contribute to good health**

- Trees absorb and soften irritating (stress-building) noise in the urban environment. Some studies suggest that belts of trees 100 feet wide and 45 feet high can cut highway noise in half.
- Trees and forest create feelings of relaxation and well-being and areas for recreation, which promotes good health.
- Views of trees and landscape plantings can reduce hospital convalescent stays up to eight percent for some patients.

## **Planting trees is not expensive**

- A Chicago study determined that trees provide net benefits worth two to three times the cost of planting and caring for them over a 30-year period.
- In 1989, Milwaukee, Wisconsin's city forester examined the cost of building one mile of residential street. Along with the costs for concrete, curbs, street lights, sewer and water mains, he found that the cost for planning and planting 2 1/2-inch caliper shade trees, 45 feet apart on both sides of the street was 2.2 cents per dollar of the total construction cost, including one year of maintenance.
- While most city assets depreciate in value over time, healthy trees appreciate in value.