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Parks as Lungs

America's Urban Forests Make Environmental and Economic Sense
By Roddy Scheer

Frederick Law Olmsted, the granddaddy of American landscape architecture, had little idea how prescient he was when he told the City of New York in 1872 that the midtown Manhattan park he was busy creating would serve as the "lungs of the city." Today, the urban forests found within city parks across the country serve not only as recreational and social centers, but also as organic sponges for various forms of pollution and as storehouses of carbon dioxide to help offset global warming. Indeed, recent experiences in several U.S. cities have shown Olmsted's metaphor for what is now Central Park to be far more literal than figurative.

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Each year in Chicago, for example, the urban tree canopy removes 15 metric tons of carbon monoxide, 84 metric tons of sulfur dioxide, 89 metric tons of nitrogen dioxide, 191 metric tons of ozone and 212 metric tons of particulates, according to David Nowak, project leader of the U.S. Forest Service's Urban Forest Ecosystem Research Unit.



New York's Central Park was created in the nineteenth century by Frederick Law Olmsted to be "the lungs of the city." Here, visitors enjoy the Great Lawn.

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Trees absorb these gaseous pollutants via their leaf stomata (the tiny pores on leaves) and break them down into less-harmful molecules during

photosynthesis.

Though scattered individual trees can absorb pollution, urban forests provide the most bang for a city's buck. "Parks with higher proportions of their area covered by healthy trees will provide the greatest impacts," says Nowak. Chicago's urban forest canopy, which covers roughly 11 percent of the city's total land, saves the municipal government more than \$1 million every year, according to Nowak, in what would otherwise be spent on traditional pollution mitigation efforts.

Urban forests also play an important role in sequestering carbon dioxide, the potent greenhouse gas that is primarily to blame for global warming. In Sacramento, California, a public-private partnership called Sacramento Shade spearheaded the planting of more than 200,000 trees around the city in the mid-1990s. In a study assessing Sacramento's bolstered tree cover, Greg McPherson of the Western Center for Urban Forest Research found that the region's urban forest removes more than 200,000 metric tons of carbon dioxide from the atmosphere each year, saving taxpayers as much as \$3 million annually in pollution mitigation costs. "It's cheaper for [Sacramento] to plant trees than to generate more electricity," McPherson concludes.

Gary Moll, a vice president at the nonprofit group American Forests, asserts that trees are the "ultimate urban multitaskers," performing the functions of air filter, sponge, humidifier, heat shield, wind block and carbon sink. According to Eric Beckers of the Texas Forest Service, tree-planting efforts in urban areas boost this process, as city trees are "15 times more capable of reducing carbon in the atmosphere" than rural trees.

"We want people to understand that trees are an important part of the city infrastructure," says Moll. "There's a hard part, and there's a green part, and we should be planning for both. It's just not good business to sacrifice trees."

Under Moll's supervision, American Forests is assessing the costs and benefits of urban forests across the country. The group uses a combination of satellite data, field surveys, computer modeling software and Geographic Information Systems (GIS) technology to measure regional tree canopy and calculate its dollar value. So far, the organization has applied these analytical techniques to urban forests in and around Denver, Houston, Seattle, Milwaukee, Atlanta, Fort Lauderdale and Washington, D.C. The group is expanding the program to other cities this year.

Congress first recognized the importance of urban forests in 1978 with the Cooperative Forestry Assistance Act, which provided funds to promote the maintenance, expansion and preservation of urban tree cover while encouraging research and development of related technical skills at the local level. The legislation also called for tree-planting to complement existing urban forest and open space maintenance programs. The Urban and Community Forestry Assistance Program of 1990 expanded aid to state foresters and nonprofit organizations working to promote and expand urban forest parklands. President Bush has pushed to increase annual appropriations under the program by more than \$31 million per year.

Meanwhile, back in New York City, Olmsted's parks are working overtime to decrease air pollution and sequester carbon dioxide while also providing recreational opportunities and natural beauty for more than eight million city dwellers. Nowak estimates that the removal of air pollution by New York City's existing tree cover saves taxpayers as much as \$10 million each year. Thanks to appropriations and encouragement from Mayor Rudolph Giuliani, the city's parks department has planted more than 15,000 trees annually for the past three years.

Today, fully one-quarter of New York City's 28,000 acres of parks qualifies as urban forestland. Fiona Watt, New York City's chief of forestry, expects the tree canopy to "grow even more in coming years as the city government is setting aside additional funds for aggressive tree-planting programs, focusing not only on parks, but also on sidewalks, traffic islands and other areas usually reserved for concrete." According to a recent study by the U.S. Forest Service, New York City's five boroughs are home to more than five million trees, covering nearly 17 percent of the public and private land. Half of these trees are growing in parks.

Today, New York City's crown jewel, Central Park, truly fulfills its designer's vision. Every year, 20 million people -- not to mention 275 of America's 800 bird species -- visit Central Park, in part because of the refreshing air made possible by 26,000 trees across 136 acres of woodlands. "Disturbed by the unhealthy condition of families living in cramped tenements, where every breath was fouled with smoke from burning coal, Olmsted proposed a new role for vegetation to relieve the stress of city life," writes Charles A. Lewis, author of *Green Nature/Human Nature: The Meaning of Plants in Our Lives*. "He anticipated the intense growth of metropolitan areas and recognized that human benefit would accrue from setting aside land to remain forever green. Parks would be 'lungs' for cities ... where people could relax and breathe air that had been cleansed and refreshed by trees."

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