

An Excerpt from *People Habitat: 25 Ways to Think About Greener, Healthier Cities:* Cities Need Nature

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We humans have an intrinsic emotional need to connect with nature. The eminent biologist E. O. Wilson first called this need “biophilia”, and the term has stuck.¹ Yet cities also, and fundamentally, need the structure of hardscape urbanism—streets, buildings, and infrastructure—in sufficient density to achieve environmental and economic efficiency and nurture social bonds. It is critical that we incorporate nature into cities, but we must do so in a way that supports urbanity rather than replaces it.

At the neighbourhood scale

I remember a happy day in our neighbourhood a few years back. When I came home from work, three new trees had been planted on our block. That’s a small thing, of course, just three street trees. But their predecessors had been sorely missed for a few years. When we moved into the neighbourhood a little over 20 years ago, one of its major assets was large, stately street trees, most of them oaks, on nearly every block. The neighbourhood was built in the 1920s, so our oldest trees would have been around 70 years old when we moved in.

Visitors are always struck by them, especially if they have come from a newer suburb. Many of those older trees remain, but over the more than two decades that we have lived in the neighbourhood we have lost quite a few to disease and, mostly, storms. I’m sure I was not the only one whose spirits were lifted by the discovery that new ones had been planted: researchers have shown that even just a view of greenery from a window can give us a psychological and physical boost.

Indeed, for our ancestors a keen awareness of the natural environment was essential to survival. When we are deprived of nature, we lose a basic aspect of humanity. Who among us has not enjoyed a stroll, ridden a bike, read a book or magazine, learnt a sport, fallen in love, taken a nap, or otherwise enjoyed the respite and communion with nature provided by a natural area or lovely city park? In cities, the presence of nature—whether interspersed among our streets, buildings and yards or more organised into parks—connects us with growth and with the seasons, providing a softness to complement the concrete of our streets and sidewalks and the brick and wood of our houses.

Among parks, I love those that are neighbourhood-scaled the most. While large green spaces such as New York’s Central Park, San Francisco’s Golden Gate Park, or Washington, D.C.’s Rock Creek Park are wonderful, there is a more personal dimension to those that are a bit smaller, more a part of their neighbourhoods. I love, for example, London’s Russell Square, just a few steps from the British Museum and, at eight acres in size, no larger than the surrounding city blocks. It is large enough so that a visitor enjoys an especially beautiful and tranquil experience, yet small enough so that it fits neatly into and remains a part of its urban setting.

Smaller still, another of my favourites is only about an acre and a half in size. It is tucked into a



neighbourhood of single-family homes on small lots in Chevy Chase, Maryland, right on the boundary separating Chevy Chase from the adjacent city of Bethesda and only a block from Bethesda's very busy and urban main street. Elm Street Park is so well-scaled to its neighbourhood and has such beautiful large, mature trees that I go out of my way to stop there if I am riding my bike nearby, which I do often. There are small gazebos, a playground, and scattered picnic tables but otherwise it has no special facilities. It's just there, and I love it.

The science of urban nature and people habitat

Research suggests that I should. At the University of Michigan, a test group of students walking through an urban arboretum scored better on memory and mood indicia than a control group walking on city streets. When the roles of the two groups were reversed a week later, the students who walked through the arboretum again scored higher. The researchers suggested that the additional mental demands associated with city streets—particularly the need to pay attention to cars—caused stress, while in nature we can let our minds wander, enabling us to “rest our attention”.²

More broadly, an academically rigorous review of 86 peer-reviewed studies published since 2000, conducted by Danish researchers for the International Federation of Parks and Recreation

Administration, was published in January 2013. It found an immense range of correlations between nature and public health, from reduced headaches to longevity:

Nature and green spaces contribute directly to public health by reducing stress and mental disorders, increasing the effect of physical activity, reducing health inequalities, and increasing perception of life quality and self-reported general health. Indirect health effects are conveyed by providing arenas and opportunities for physical activity, increasing satisfaction of living environment and social interactions, and by different modes of recreation . . .

The direct health benefits for which we found evidence on positive effects included psychological well-being, reduced obesity, reduced stress, self-perceived health, reduced headache, better mental health, stroke mortality, concentration capacity, quality of life, reduced Attention Deficit Hyperactivity Disorder (ADHD) symptoms, reduced cardiovascular symptoms and reduced mortality for respiratory disorders, reduced health complaints, overall mortality, longevity, birth weight and gestational age in low socioeconomic population, post-disaster recovery, and reduced cortisol.

1. Russell Square, London, United Kingdom.

The evidence for positive impacts of urban parks on physical activity was highlighted as “strong”, with the academically established evidence in support of other effects found to be at least “moderate.” (Conversely, when a correlation between parks and health was insufficiently established in the literature, as with the effects on lung cancer or diabetes, the authors said so.)³

Another large study, reported in a monograph published by the National Recreation and Park Association in 2010 found a direct correlation between health effects and proximity of parks:

Scientists in the Netherlands examined the prevalence of anxiety disorders in more than 345,000 residents and found that people who lived in residential areas with the least green spaces had a 44 percent higher rate of physician-diagnosed anxiety disorders than people who lived in the greenest residential areas. The effect was strongest among those most likely to spend their time near home, including children and those with low levels of education and income.

Time spent in the lushness of green environments also reduces sadness and depression. In the Dutch study, the prevalence of physician-diagnosed depression was 33 percent higher in the residential areas with the fewest green spaces, compared to the neighbourhoods with the most.



The NRPA report even cites studies finding lower levels of aggression, violence and crime in Chicago housing projects with views of vegetation than in those without.⁴

People intuitively appreciate these benefits and, as a result, are willing to pay a significant premium for living near nature. According to a 2006 report published by the Trust for Public Land (TPL), a review of 25 studies investigating whether parks and open space contributed to values of neighbouring properties found increased value in 20 of the studies. Those benefits accrue to the municipalities as well:

“The higher value of these homes means that their owners pay higher property taxes. In some instances, the additional property taxes are sufficient to pay the annual debt charges on the bonds used to finance the park’s acquisition and development. ‘In these cases, the park is obtained at no long-term cost to the jurisdiction,’ [Texas A&M Professor John] Crompton writes.”



- If you plant a tree today on the west side of your home, in 5 years your energy bills should be 3 percent less. In 15 years the savings will be nearly 12 percent.
- One acre of forest absorbs six tons of carbon dioxide and puts out four tons of oxygen.
- A number of studies have shown that real estate agents and home buyers assign between 10 and 23 percent of the value of a residence to the trees on the property.
- Surgery patients who could see a grove of deciduous trees recuperated faster and required less pain-killing medicine than similar patients who viewed only brick walls.
- In one study, stands of trees reduced particle pollution in the air by 9 to 13 percent, and reduced the amount reaching the ground below by 27 to 42 percent compared to an open area.

Several years ago walkability guru Dan Burden, who founded the Pedestrian and Bicycle Information Center, wrote a detailed monograph titled *22 Benefits of Urban Street Trees*. Among other things, Burden calculated that “for a planting cost of \$250-600 (includes first three years of maintenance) a single street tree returns over \$90,000 of direct benefits (not including aesthetic, social and natural) in the lifetime of the tree.” He cites data finding that street trees lead to slower and more appropriate urban traffic speeds, increase customer attraction to businesses, and obviate increments of costly drainage infrastructure. In at least two recent studies (reported after Burden’s analysis), trees were even found to be associated with reduced crime.⁸

Burden summarises trees’ biological and emotional functions:

“Urban street trees provide a canopy, root structure and setting for important insect and bacterial life below the surface; at grade for pets and romantic people to pause for what pets and romantic people pause for; they act as essential lofty environments for song birds, seeds, nuts, squirrels and other urban life. Indeed, street trees so well establish natural and comfortable urban life it is unlikely we will ever see any advertisement for any marketed urban product, including cars, to be featured without street trees making the ultimate dominant, bold visual statement about place.”

That is extremely well said. And it applies to urban nature generally, not just to trees.

The TPL report cites corroborating evidence from the University of Southern California, finding that investment in a pocket park in a dense urban neighbourhood would pay for itself in 15 years as a result of increased tax revenues.⁵

Environmental services provided by urban trees

Back to the trees in my neighbourhood, I would love them without knowing why but it is very comforting to know that science can reveal some of the reasons. Apart from what they may do for me, trees also provide measurable environmental services to their communities. If you are interested in learning more about the benefits of trees, visit the websites of the National Arbor Day Foundation⁶ and the United States Forest Service.⁷ Among the tidbits I have discovered on one or the other of those two sites are these:

- The net cooling effect of a young, healthy tree is equivalent to 10 room-size air conditioners operating 20 hours a day.

2. Elm Street Park, Chevy Chase, Maryland, USA.

3. Green space serving multiple functions as tree cover, street median, stormwater catchment, and pocket park in Bethesda, Maryland, USA.

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In particular, smart growth posits that, to correct the myriad environmental, economic, and social problems associated with suburban sprawl, metropolitan areas must develop in more compact, more urban patterns, with increased densities more conducive to walking and the use of public transit.



Green infrastructure to control water pollution

Indeed, urban greenery can also help control water pollution. An increasingly popular set of techniques is called “green infrastructure”, in the form of strategically designed vegetation and landscaping to filter stormwater (while also lowering summer temperatures and releasing oxygen).

The stormwater control provided by green infrastructure is significant. One of the most pressing environmental challenges facing cities and suburbs in the United States is the impact of rainfall that becomes polluted runoff when it flows over impervious surfaces—such as highways, parking lots, rooftops and driveways—on its way into our rivers, lakes, and coastal waters. The United States Environmental Protection Agency estimates that more than 10 trillion gallons of untreated urban and suburban stormwater runoff enters our surface waters each year, degrading recreation, destroying fish habitat, and altering stream ecology and hydrology.⁹

The problem becomes particularly acute in cities that drain both stormwater and sewage into a common, and typically aging, set of pipes and conveyances. When major storm events prove to be more than these systems can handle, the result is “combined sewer overflows”, a noxious mess.

Green infrastructure (also known in the

study of water pollution as the key component of “low impact development”) captures and filters stormwater before it runs off into sewers or urban waterways. It replicates the way nature deals with precipitation—using vegetation and soils as natural sponges for runoff—rather than relying exclusively on the “gray infrastructure” of old technology, such as concrete pipes and holding tanks. Types of green infrastructure include green roofs, roadside plantings, rain gardens, permeable paving, and rainwater harvesting, among others.

The American Society of Landscape Architects maintains a massive database containing hundreds of case studies of successful examples, half of which are retrofits of existing development. Another sizable batch involves urban redevelopment projects. The organisation has found that the use of green infrastructure reduces development costs more frequently than it adds them, probably because successful green infrastructure can obviate some of the concrete “gray infrastructure” otherwise required to drain runoff.¹⁰

Bioswales are the most common type employed, with rain gardens and porous pavers close behind. Of all of the profiled projects, 40 percent involve the management of an acre or less of land; 75 percent involve the management of five acres or less. 68 percent of the projects have been assisted with public funds.

Philadelphia is perhaps the country’s leading example of a city committed to large-scale green infrastructure implementation. Under a formal plan to meet federal Clean Water Act requirements, and approved by environmental regulators, the

4. Capitol Avenue, Hartford, Connecticut, USA, before its redesign (Photo: United States Environmental Protection Agency).

5. Capitol Avenue, Hartford, Connecticut, USA, as redesigned (Image: United States Environmental Protection Agency).

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city has agreed to transform at least one-third of the impervious areas served by its sewer system into "greened acres"—spaces that use green infrastructure to infiltrate, or otherwise collect, the first inch of runoff from any storm. My former colleagues at the Natural Resources Defense Council say the program will keep 80-90 percent of annual rainfall from these areas out of Philadelphia's over-burdened sewer system.

In a different undertaking, the federal Environmental Protection Agency has launched an innovative planning program designed to help bring more green infrastructure (and green building practices) to America's state capitals, making them simultaneously more environmentally resilient and more beautiful. The idea behind *Greening America's Capitals* is that ideas nurtured in these regionally prominent cities may become influential within their respective states and among comparable cities elsewhere.

Indeed, elected representatives and their staffs typically come from all around their respective states but work at least part-time every year in the capital cities. What they experience there, good or

bad, imparts lessons that can be taken back to the representatives' home districts or even incorporated into statewide policy. Many visitors frequent state capitals for business or pleasure, each forming and taking away impressions. I took a close look at the EPA-assisted plan for greening Hartford, Connecticut and was seriously impressed.

Lessons for smart growth

The benefits of nature in cities are multiple, and they are personal and emotional as well as environmental and scientific. And they are especially critical to the field of "smart growth", to which I have dedicated much of my professional life.

In particular, smart growth posits that, to correct the myriad environmental, economic, and social problems associated with suburban sprawl, metropolitan areas must develop in more compact, more urban patterns, with increased densities more conducive to walking and the use of public transit. Central cities, weakened by decades of neglect in the late 20th century as people and investment fled to suburbs – particularly in America—must become strong again. (Finally, some once-declining cities are beginning to do just that.) Suburbs must become more compact and walkable, too—more like cities. This is essential, but I believe it is untenable without integrated nature.

With respect to water pollution, for example, smart growth does its own part in reducing the volume of runoff across watersheds, because reinvestment in central cities and more compact growth in suburbs reduce the spread of pavement and other impervious surfaces into previously undeveloped or minimally developed areas. But they are not enough, because we also need waterways within and near our developed areas to become cleaner and safer. Many cities and suburbs are now undergoing more intensive development, as they must; but, if the development is not sensitive to the potential for runoff, some waterways could become even more polluted. I would argue that, in places where there is significant rainfall, smart growth simply isn't smart without it.

More generally, we clearly need urban density even to approach solving problems related to excessive land consumption, automobile-dependent transportation patterns, and increasing carbon emissions. I have become a big fan of urban nature in large part because its many forms have the effect of softening that density, making it more appealing as well as better functioning. Good people habitat requires no less: if our solutions do not work for people, they will never work for the planet. 

