

SCIENCE

Is benefit of having trees 'oversold' in Twin Cities green space planning?

A new science of valuing nature will shape our urban projects of the future.

By Josephine Marcotty (<http://www.startribune.com/josephine-marcotty/10645336/>) Special to the Star Tribune

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Trees in the city may not be as green as we think.

They produce rotting leaves that pollute lakes and streams with too much phosphorus. They can actually trap air pollution right at nose level. And what with watering, maintenance, and replacement when they die, they are not always an efficient way to store carbon.

In short, often “trees are oversold” as a natural solution for environmental problems in cities, according to Bonnie Keeler, a University of Minnesota professor who studies ways of valuing nature. In fact, she reviewed 1,200 scientific studies on increasingly popular green infrastructures such as urban forests, parks, rain gardens, and wetlands and found in a recent paper that it’s unclear how well any of them stack up against “gray” solutions like concrete storm sewers and air conditioning.

It’s an increasingly urgent question for the Twin Cities. At projects such as the Ford site in St. Paul, the Mississippi River Upper Harbor in Minneapolis and a redesign for sections of Minnehaha Creek, planners face complex choices for managing stormwater and air pollution.

The answers will help define the future for a growing share of the world’s population. By 2050, two out of three people will live in urban areas that will affect their health and well-being, Keeler said. Immense social challenges like climate change, public health and public funding will have the greatest impact on people who live in cities.

“There is a huge interest in expanding funding for green infrastructures,” she said. “But we don’t have a tool to understand their value.”

Take trees, for instance. There is no question that they are crucial to global ecosystem health. But in the city it can be a different story. Keeler’s review, published last month in *Nature Sustainability*, found that most evaluations of urban trees focused on two benefits: filtering air and sequestering carbon. Few considered the costs of maintenance, replacement, or public health. Even their estimated ecosystem values ranged widely — from \$5 to \$402 per tree.

At the same time, there’s no widely accepted method to calculate the more ephemeral value that trees provide, such as joy in their beauty, a resting places for birds, or the coolness of their shade.

“Green is sometimes more expensive, but it can carry other benefits that are not as well captured in markets,” Keeler said.

Nonetheless, urban planners around the Twin Cities area are now incorporating these hard-to-measure benefits into their decisions on managing land and water.

Minnehaha Creek is a showcase for the way different cities along its route increasingly see the waterway as tool to leverage green solutions for an array of social and environmental problems. As the western Twin Cities suburbs grew around it, the creek became an easy place to get rid of water that ran off streets and parking lots. Along much of its length it was forgotten, hidden by buildings and covered by streets.



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Workers installed “soil burritos” to restore Minnehaha Creek’s natural curves in St. Louis Park, part of a project to improve water quality

But that changed in 2009, starting with Methodist Hospital in St. Louis Park. Like many buildings along its banks, the hospital had turned its back to the creek and a nearby wetland. But the hospital's expansion plans brought officials of the Minnehaha Creek Watershed District into the conversation. The district officials, who help manage the creek from Lake Minnetonka to the Mississippi River, saw a chance to improve water quality in the creek by bringing back its natural curves, which had long ago been straightened so stormwater could move along faster to the Mississippi. Curves would slow down the flow of water, increase flood plain along the banks and expand the size of the wetland behind the hospital, filtering out more dirt and pollutants.

A decade later the entire health care complex has turned around to face to the wetland. It's paid for boardwalks that allow patients and staff to unwind outdoors everyday, and even pulled the theme of water and wildlife into its interior design.

The staff "can feel the joy of coming to a workplace where they can enjoy nature," said Duane Spiegel, vice president of real estate for HealthPartners, which merged with the hospital's parent organization, Park Nicollet, in 2013. Patients and their families are no longer confined to the hospital — they can go outside.

"A good healing environment, that helps them in recovery," said Dr. Tom Kottke, medical director for health and healing at HealthPartners.

Hopkins replants a park

There is no question, Keeler said, that improved mental health is one of the clear benefits of green infrastructure in urban areas. But how do cities determine "the nature of the nature?" she asked.

"Do people just need to walk by trees, or do they need an immersive walk with the sound of birds?"

The difference matters, she added. Some people want lawns, soccer fields and picnic tables. Others want dog parks, urban wilderness or farmers markets. Put in the wrong one, and instead of a thriving outdoor space, she said, you eventually get a blighted eyesore.

But put in the right one, as Hopkins did with its Cottageville Park improvement project along Minnehaha Creek near Blake Road and Highway 7, and it can revive a neighborhood.

A tiny park surrounded by apartment buildings along the creek had become a place "where crime could happen unseen," said Kersten Elverum, Hopkins' director of economic development and planning. The area was redesigned in 2015 as part of a larger project with the watershed district, with water and flood control included as part of the package. The creek banks were replanted, the park was enlarged, and a sweep of grass in the center now covers a basin to hold and treat stormwater. The larger, open park now includes a community garden, trails, a basketball court and playground, making it safer and a destination for the entire neighborhood.

"There are a lot of ways that this diverse community that lives around the park can get together and get to know each other," Elverum said.

The environmental benefits of the project are less obvious, but significant: Some 400 feet of stream bank were restored, and the new site treats stormwater runoff from 22 surrounding acres, removing 26 pounds of phosphorus a year.

"And that impacts everyone downstream," Elverum said.

A stream is born

There are places, however, where gray infrastructure still tops the green version — especially where it's already built. Downtown Minneapolis, for instance, relies on 16-foot concrete stormwater tunnels to drain millions of gallons and lots of pollutants from the streets directly into the Mississippi River.

But “they keep downtown functioning,” said Kristina Kessler, the city’s director of surface waters and sewers. And while a rain garden on every corner of the city would certainly help, she said, the long-term maintenance cost “is beyond what we can do.”

Often, said Keeler, the best opportunity to get the most out of green infrastructure, is a new development — such as the massive project underway at Ford Motor site in St. Paul’s Highland neighborhood. Even so, as that site makes clear, justifying the added expense is still a new exercise in public policy.

One of the most popular features of the new development is the novel treatment of stormwater. Instead of passing through underground sewers, the water will flow above ground in a stream running through the center of the complex — which will also provide the water to re-create the falls at nearby Hidden Falls park.

It will be aesthetically beautiful — and, on its face, cost about the same as underground pipes, said Wes Saunders-Pearce, St. Paul’s water manager. But using a complex computer model, planners were able to quantify the added benefits from the aboveground version, including factors such as water quality improvements and energy- and greenhouse-gas reduction from all the extra trees that could be planted along the stream.

“That was a huge turning point,” he said. “It was twice the benefit ... compared to the traditional way of planning.”

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Josephine Marcotty has covered the environment in Minnesota for eight years, with expertise in water quality, agriculture, critters and mining. Prior to that she was a medical reporter, with an emphasis on mental illness, transplant medicine and reproductive health care.

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