Acre for acre, urban trees can store as much carbon as tropical forest

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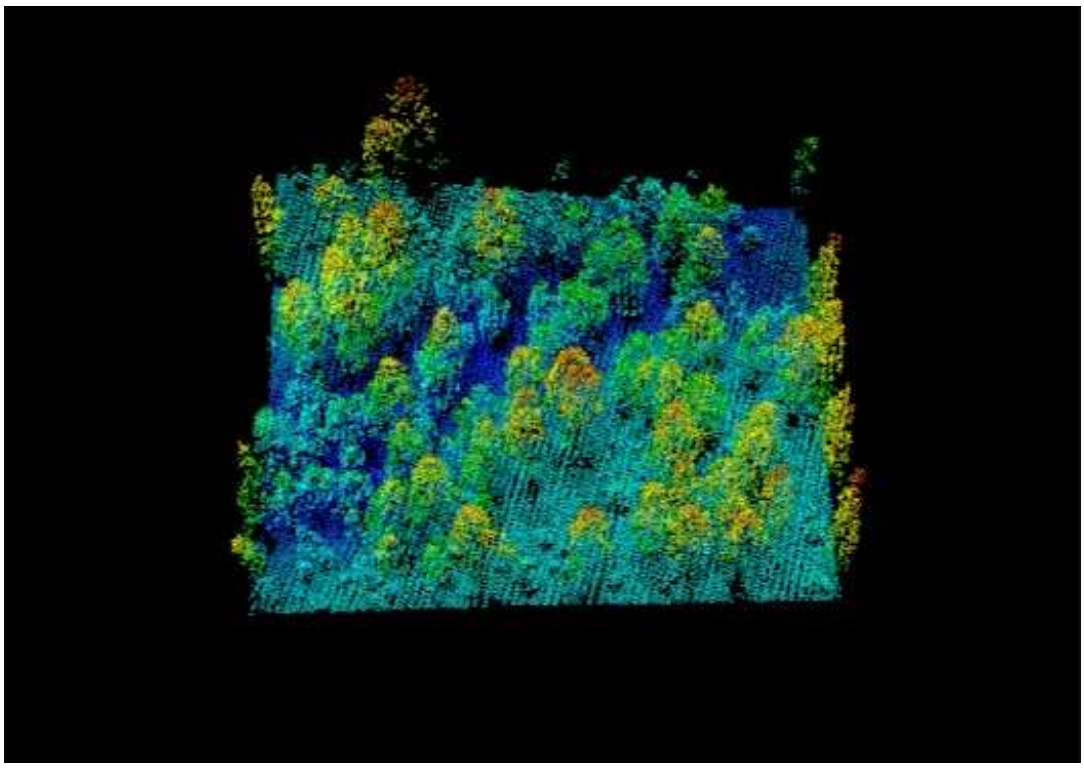

Trees lining city streets, in public and private gardens, in parks, and in patches of urban woodland do a lot for cities. They help mitigate air pollution, lessen the urban heat island effect, provide flood control, and contribute a host of other benefits. Some studies have valued these ecosystem services at almost USD $1 million per square kilometer per year.

And it turns out that these trees, collectively known as the urban forest, also contribute more than you might imagine to carbon sequestration, according to a new study published in the journal *Carbon Balance and Management*.

Researchers from University College London used a laser-based remote sensing method called LiDAR to build an intricately detailed 3D picture of more than 84,000 individual trees in their home borough of Camden, in northwest London. Then, based on the volumes of trunks and crowns, they calculated the amount of carbon each tree stores.

“We were able to map the size and shape of every tree in Camden, from forests in large parks to individual trees in back gardens,” lead author of the study and University College London geographer Phil Wilkes said in a press release. “This not only allows us to measure how much carbon is stored in these trees but also assess other important services they provide such as habitat for birds and insects.”

Wilkes and his colleagues pioneered this method in tropical forests, but they had to calibrate it anew to apply it to urban trees. That's because tree crowns can grow very differently in open parks or street canyons than they do in closed-canopy forest. In addition, urban trees tend to encounter unique conditions such as exposure to car exhaust, extra water from irrigation, trimming to avoid contact with buildings and power lines, and so on.

The researchers found that Camden's trees store an average of 51.7 metric tons of carbon per hectare. Trees in certain areas such as Highgate Cemetery and Hampstead Heath, the borough's famous, sprawling park, store up to 178 metric tons of carbon per hectare.

Overall, UK forests store an average of 53.6 metric tons of carbon per hectare, making certain parts of Camden carbon-sequestration hotspots.

These areas also provide carbon storage roughly on par with tropical rainforests (a median value of 190 metric tons per hectare) and conifer forests outside Seattle (166 metric tons per hectare).

Several caveats are in order. First, the results suggest that the *maximum* carbon density in urban forests is in the same range as the *median* carbon density in certain natural forests. Different studies have used varying methodologies to estimate carbon density, so these figures may not be directly comparable. And just because urban forest *can* store this much carbon doesn't mean that it always or typically will. Trees in major US cities store about 7.7 metric tons of carbon per hectare, a much lower figure.

Still, as cities expand the contribution of urban forests to carbon sequestration – and other ecosystem services – will become more important. The results might also nudge us to see urban forests a little differently. It's easy to dismiss city trees as mere remnants or decoration, and assume that Real Forest lies elsewhere. But what if we walked through an urban forest with the same reverence we might feel when hiking through a tropical forest, now that we know what those city trees are capable of?

Source: Wilkes P. *et al.* "Estimating urban above ground biomass with multi-scale LiDAR." *Carbon Balance and Management*. 2018.

Image: Giphy